

DRAGON USER

The independent Dragon magazine

95p US$3.25 September 1985

Machine code word processor

The Dragon's ROM — part one

Flex revisited

Dragon answers

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How to submit articles

The quality of the material we can publish in *Dragon User* each month will, to a very great extent depend on the quality of the discoveries that you can make with your Dragon. The Dragon computer was launched on to the market with a powerful version of Basic, but with very poor documentation.

Articles which are submitted to *Dragon User* for publication should not be more than 3000 words long. All submissions should be typed. Please leave wide margins and a double space between each line. Programs should, whenever possible, be computer printed on plain white paper and be accompanied by a tape of the program.

We cannot guarantee to return every submitted article or program, so please keep a copy. If you want to have your program returned you must include a stamped, addressed envelope.

Contents



Editorial

"OUR INTENTION is to be at the next 6809 Show with a 128K Dragon running hard disks and Flex."

Fighting words from Ted Oprychal — but what do they really mean for the Dragon owner?

If he can do it, then it means the Dragon is back with a vengeance.

What's more, Eurohard seem to be committed to producing a 128K Dragon too — though they don't seem too sure whether it should be 6809 or 68000.

Add to this Compusense's commitment to a hard disk interface, floppy disk drives from Race and Radofin, new disk formats from Eurohard, the so called Dragon MSX machine, and sundry developments from independent companies, and the Dragon's future begins to take on a rosier hue.

But, at the risk of repeating something that has been said before in this column, is this what the ordinary Dragon user wants?

If it means that the Dragon 32 is relegated to the cupboard, then there certainly are a lot of *Dragon User* readers who won't like it.

Then again, if it means the continued development of new Dragon machines, compatible with the existing ones, then there are just as many readers who will be all in favour of it.

Perhaps the single word 'compatibility' is the most important.

Eurohard should take a lesson from Atari and Commodore — the C128 runs Commodore 64 software, giving it thousands of programs even before its launch, and the 130XE runs Atari 800XL 800 and 400 software.

If a 128K Dragon is produced, then it has to use at least some of the existing software for the Dragon 32 or 64.

There must be a Dragon 128 — it is the logical next step in the evolution of the Dragon family of micros. But it should be a progression, not a break with the past.

Letters

This is the chance to air your views — send your tips, compliments and complaints to Letters Page, *Dragon User*, 12-13 Little Newport Street, London WC2H 7PP.

Fantasy Fight

IN REPLY to Mr Vine's letter in the June issue of *Dragon User*, I have found a way to increase your lives when playing the game *Fantasy Fight* by Cable Software. I have also found the memory location for the 35 screens and also the respective weapons and spells. The memory locations are as follows:

MEMORY LOCATION USE
&H60C7...The number of the screen on which you start.
&H60D6...The number of lives that you start with.
&H473D...Red keys.
&H473E...Blue keys.
&H473F...Bow.
&H4740...Green keys.
&H4741...Shield spells.
&H4742...Lightning bolts.
&H4743...Sword.
&H4744...Mace.
&H4745...Ice rays.
&H4746...Fire rays.
&H4747...Emerald rays.
&H4748...Wall spells.
&H1E50...Arrows.

To use these locations first load the program and press reset. To gain extra lives type POKE &H60D6, plus the number you require, and poke &H60C7, plus the number of the screen you wish to start on. However, on some screens your starting position is directly in the middle of a block, so be careful when using this location. Then type EXEC&H60B4, and the game should run. Pressing reset here performs a warm start instead of a cold start, so EXEC only is required a second time around.

To use the locations for the different spells and so on some poking of the program must be done, as the program has a routine which clears most of these locations en masse. First, load the program and press reset as before, then type in the following statements, *without* a line number.

```
FORI=&H60DD TO &H60
DF:POKEI,&H12:NEXTI
FORI=&H60E3 TO &H60
EE:POKEI,&H12:NEXTI
```

I would recommend that you save the program at this point, to give you a changed copy for future use, to do so type:

```
CSAVEM"FANTASY",
&H1E50,&H7E5B,&H608E
```

Then you can use the locations. As before, poke the location with the number you require.

Before you start, some words of warning. When using the above locations, make sure that the value does not exceed 127 at any point in the game, as otherwise the spell or weapon becomes useless. It is also advisable to only poke the value 1 into the locations that refer to the sword, mace and bow. Also, make sure that the value you poke into the location &H60D6 is pretty small, (say <&H40), as otherwise the program crashes for some unknown reason.

Adam Law
24 Farmington Road
Benhall
Cheltenham
Glos GL51 6AT

Printer Control

HAVING just read your review of *Printer Control* in the August issue I feel I must correct one important point.

The version of the program supplied to your reviewer was only compatible with the Epsom 8-bit graphics type of printer. This version was supplied because this is the most common. However, there are versions for other printers. If a customer does not state his printer type when ordering I ask him for it before despatching the goods in order to ensure he gets a compatible version.

I have versions of the program which drive the 8 pin, 7 data bit types and the 7 pin, 7 data bits wrong way round types. I've even printed a picture with a version driving a serial printer, 6 data bits, with an interface plugged into the cartridge port!

There is also a version which drives a daisywheel typewriter or printer. The daisywheel cannot produce the graphics but it still gives text positioning, underline and access to special characters.

Any reader has only to ask — I will gladly advise.

William MacGowan
MacGowan Consultants

Data?

IN YOUR editorial in the June *Dragon User* on the increasing scarcity of Dragon software you comment on the need for a chain of repair agents. That is commendable, and perhaps Compusence, the Dragon importers will do so. There is another aspect of the servicing of Dragons that seems to have had little attention, or none at all: servicing data, test figures and circuit diagrams are most difficult even impossible, to acquire. Undoubtedly your readership includes very many users competent to do their own servicing, and I would like to suggest that you publish a series of articles and circuit diagrams to help them and to interest others.

John A. Young
Shetland Isles

Not so Super?

I'D VERY much like to hear of other readers' experience with the *Super Writer II* word processing program. On paper, this is streets ahead of any home computer WP program I have used or examined. In practice, I have found mine almost unusable because it crashes with awful regularity, despite willing help from Dragon Data in the past, and Touchmaster more recently.

It has been suggested to me that ROM based programs are more prone to crashes than RAM based ones (ie on tape or disc), though I can't see why. Indeed, what is the BASIC interpreter if not a ROM program, and it's perfectly reliable, as indeed is my Dragon 32 in any other application. It has also been suggested that the program is rather sensitive to mains voltage troughs (spike eliminating plugs apparently only protect against voltage crests). If there is anything in this, does anybody know of a gadget to protect against mains voltage dips?

A further suggestion is that there may be a fault in the cartridge connections in my computer, which I can't refute as *Super Writer II* is the only cartridge program I have ever used.

Ruben Hadekel
4 Lalor Street
London SW6 5SR

Mnemonic

MANY THANKS, Peter Davis, of Doncaster, for alerting me to the fact that my Disassembler (June issue) contains an incorrect mnemonic. The hex op-code 90 disassembles as LDX instead of the SUBA that it should be. To correct this, load the program into memory and apply the following four POKEs to the load address+2537 onwards and re-save the corrected version. For example, if your version loads at 12001 as per the original listing:

```
CLOADM"DIS12001"
POKE 14538,83
POKE 14539,85
POKE 14540,66
POKE 14541,65
CSAVEM"DIS12001",1200
1,15210,12001
```

My apologies for not spotting this many moons ago when I first compiled this table.

Pam D'Arcy
21 Wycombe Lane
Wooburn Green
High Wycombe
Bucks HP10 0HD

Jigsaw

Having read your review of *Jigsaw* from Vidipix, I feel that I must put finger to keyboard and express my disagreement at your conclusions. I purchased *Jigsaw* at the last 6809 show and have had many happy hours trying to complete the puzzles provided with the game.

I agree that the idea of a jigsaw on a computer seems unworkable, but the author has produced a very enjoyable game at a very reasonable price. Although Jigsaws are not everybody's cup of tea, I am sure there are many people who prefer them to the arcade games we have become used to.

Roy Coates
25 Clevely Road
Calderstones
Liverpool L18 9UN

Eurohard — plans ahead

EUROHARD'S Chief of Development Equipment, Jordi Martinez, was on a working holiday in London last month. Between visiting various companies working on Dragon hard and software, he found time to drop into the *Dragon User* offices.

"The next machine to be launched by Eurohard," Jordi said, "will be a Spanish Dragon — this will be the Dragon 200. There will also be a Dragon 200-E, with possibly a piggyback board with an 80 column card built in."

Eurohard is also planning the next stage on in the development of the Dragon — "the new machine may be a Dragon with 128K. It may use the 6809, or the 68000 — we have not yet begun the program of development," Jordi stated.

On the firmware front, Eurohard has written a new Dragon DOS. "It's a little slower than the old DOS, because we have added a verification routine," he said.

"The new Dragon DOS is in production now. We may be changing or upgrading the EPROMs on old machines, but no final decision has been made on that yet."

Eurohard is also marketing new versions of the Dragon disk drive. "We have double sided 80 tracks, double sided 40 tracks, and a single sided 40 tracks — that's three different types. We will be staying with 5" disks for the time being, but we may go for different formats in future."

Jordi also said that Eurohard has been selling a considerable amount of business software in Spain and in Europe.

He is worried, however, that Dragon users in the UK appear to be losing patience with Eurohard. "Eurohard is trying to get the most for the Dragon, but it takes time to develop new systems. When the development is finished, there will be new machines on the market."

In the meantime, people who have technical queries can contact Jordi at Eurohard in Spain. Write to Señor Jordi Palet Martinez, Jefe del Equipo de Desarrollo, Eurohard SA, Ctra. Sevilla-Gijón, Km. 202, Casar de Caceres, Cáceres, Spain.

DRAGON 200 - E

British board

TED OPRYCHAL of Compusense has said that he is "fairly certain that the September machine from Eurohard will be the 128K board we had made up."

"We should have 100 128K upgrade boards ready by the end of August," he said. "Our next project is the hard disk interface.

"Our intention is to be at the next 6809 show with a 128K Dragon running hard disks and Flex," he stated.

Ted would like to hear from Dragon owners throughout the country just what it is they want from the Dragon — "you tell us what you want, and if there is enough demand we'll do it."

Dragon's welcome

BOB MORGAN of the Mid Wales Tourism Council has arranged a holiday with a difference for jaded Dragon owners.

Called 'Bring Your Dragon Home', it is a weekend package at a country house hotel in Mid Wales the last weekend in October.

There will be talks and demonstrations by people working on new developments for the Dragon, and opportunities to get hands on experience with new hardware and software.

"The main aim," Bob says, is to make Dragon using more prestigious and to give the machine a bit of publicity."

Bob himself is an enthusiastic Dragon user, and has a Dragon 64, dual disk drives Flex and OS9.

The cost is anticipated to be about £35.00 per person, and anyone interested should contact Bob Morgan, Marketing Information Officer, Mid-Wales Tourism Board, Canolfan Owain Glyndwr, Machynlleth, Powys SY20 8EE.

Eddy steady go!

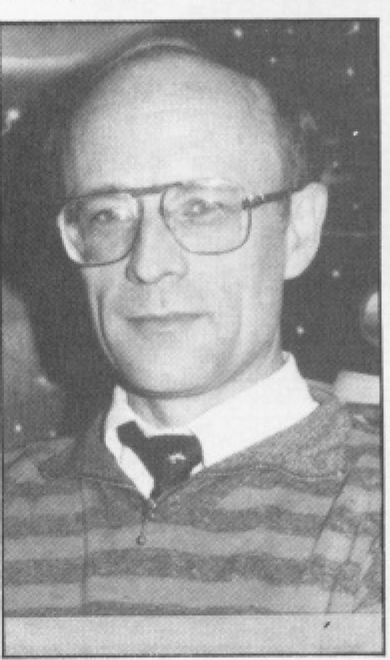
EDDY, the hero of Incentive Software's *Backtrack*, has been busy recently.

First of all there was the final of the Backtrack competition. For all of you who have never seen the game, it involves helping Eddy to escape from various mazes. Those who managed to reach the final screen were eligible to enter a competition — the five best slogans for Incentive got their inventors a chance to fight it out for a Cumana 5" Disk Drive.

The eventual winner was Barry Ward, of Wokingham, Berkshire. He completed the first two parts of *Backtrack* in eight minutes and nine seconds — a scant 22 seconds in front of his nearest rival.

Eddy will be making a comeback in Incentive's next Dragon game, *Eddy Steady Go!* This is a 21 screen arcade game, with over 60 levels of difficulty. It features moving platforms, falling objects, lasers, lifts and see saws.

Eddy Steady Go! will be released at the beginning of October, at £6.95. Contact Incentive Software, 54 London Street, Reading RG1 4SQ.



Barry Ward

Dumper

MACGOWAN Consultants, which recently released *Printer Control* for the Dragon, has a new program — *Dumper*.

Dumper will dump screens to printer, and is a machine code relocatable program which users can incorporate into their own basic or machine code programs, whether on tape or disk. *Dumper* gives the user the facility to specify what part of the screen desired, and how large the printout is to be.

Like *Printer Control*, *Dumper* is available for just about any printer — MacGowan will configure the program for each purchaser's requirements.

Dumper costs £5.00 plus 50p postage and packing, from MacGowan Consultants, 6 Arnhem Drive, Caythorpe, Nr Grantham, Lincs NG32 3DQ.

Flex word processor

THE LATEST program from Compusense is a new *Word Processor for Flex*.

It features an interactive spelling checker, an easy to use full screen editor, comprehensive formatting facilities, and a browse utility which allows users to search for or look at documents on disk while using the word processor program.

***Word Processor for Flex* costs £75.00 from Compusense.**

Coding the words

***Peter Whittaker** with a machine code word processor for your Dragon*

IF YOU have a printer to go with your Dragon, then it is likely that you have already started to experiment with the potential of your Dragon to edit text for you. As I have to write a lot of essays at college, I have written this wordprocessor program to make the task of essay writing much easier. The main program is configured to run with the Dragon Disk system connected, but by entering the 'Patch', the program can be altered to work with a tape recorder instead. The program resides from &H1014 to &H1FER, so if it is run without disks, then you must PCLEAR5 before loading and EXECing the program. (If run with disks, then the PCLEAR4 carried out at cold start will protect the program.) Two strong advantages of this program are that all the keys will now auto-repeat, and that the text is printed in green on a black background,

'MENU' Screen

When the program is first EXECed, it will display the MENU screen. This gives access to the save, load, print, and input text routines. Pressing zero <0> calls the 'EDITOR' screen (see below). Pressing <1> will print out, at a readable rate, everything so far typed into the computer. If the <ENTER> key is held down the listing will pause until the key is released. When the end of the text is reached, the program will automatically go into the text input mode. Pressing either of the vertical arrow keys with the shift also depressed will return to one of the MENU/EDITOR screens. (UP arrow for MENU. Down arrow for EDITOR.) Pressing the <2> whilst the MENU screen is displayed will put the program straight into text input mode, having first printed the last page of text entered.

Pressing the <3> will send the text to the printer. The program is set up for an 80 column printer, and will print out a 10 character margin, and 70 characters of text. If a word would be split at the end of a line, the program will hold it over for the start of the next line. If you are using a Seikosha printer, then it is possible to mix double and standard width print on a line. The program is also set up to print 56 lines of text, before printing 10 blanks to pass on to the next sheet. Once the text has all been printed, the program returns to the MENU screen.

Pressing <4> or <5> will call the text save and text load routines. It is important to ensure that the cassette recorder or disk drive is ready for use BEFORE entering the name of the file to be loaded or saved. File names must be eight characters long. After saving text, the program returns to the MENU screen, but after loading new text, the program will print it out to the screen to be read.

'EDITOR' Screen

This blue/green screen is easily distinguished from the bright yellow of the MENU screen. Pressing <0> will return to the MENU screen. The functions called from this screen involve moving a cursor through the text, to select the points at which the editing is to be done. This cursor will remember its previous position in the text each time it is used. The cursor will remain in the centre of the screen at all times, and the text will scroll underneath it, being directed by the arrow keys. A message is continuously displayed at the top of the screen to remind you just which of the editor functions you have called, and a similar message at the bottom of the screen displays the RSCII code and CHR$ of the character under the cursor. The up and down arrows move the text up or down one line at a time, whilst the left and right arrows move the text one character to the side. If the arrow keys are used with the shift key depressed, then the vertical arrows move the cursor to the start or end of text, and the left and right arrows find

```
4502 :'WORDPROC' <DISC> MEMORY DUMP.
BY PETER WHITTAKER

4116 :2455000801010000= 131      4340 :2C038E2454A684BC= 795
4124 :00000000245403E8= 355      4348 :10142707BD1DA9A6= 635
4132 :245400000C200000= 164      4356 :8020F21609C72053= 747
4140 :00008E2454BF1014= 489      4364 :5749544348205052= 577
4148 :BF1020CC0000ED84= 812      4372 :494E544552204F4E= 575
4156 :B70149200B8E0400= 446      4380 :20414E44203C454E= 482
4164 :A7808C060025F939= 784      4388 :5445523E0020504C= 485
4172 :86938DF18E0448BF= 1072     4396 :4541534520574149= 543
4180 :00888E1E0CBD90E5= 882      4404 :54202D2054455854= 518
4188 :8E0480BF00888E1E= 773      4412 :204245494E472050= 501
4196 :1DBD90E58E0580BF= 1057     4420 :52494E544544007F= 581
4204 :00888E1EBABD90E5= 1056     4428 :102D86DFBD10418E= 830
4212 :BD8006810027F981= 869      4436 :04E2BF00888E110A= 726
4220 :31271E8132275C81= 557      4444 :BD90E5BDA0EA8E04= 1291
4228 :33102700C2813410= 497      4452 :E0BF00888E1129BD= 940
4236 :2702238135102702= 315      4460 :90E58601B710188E= 873
4244 :6D8130102702FE20= 629      4468 :2454BF101AF61017= 638
4252 :D7BE10144FA78486= 953      4476 :B61018B71019A680= 740
4260 :80BD10418E0400BF= 735      4484 :810E102700B9810F= 527
4268 :00888E2454301FA6= 643      4492 :102700BB810D1027= 439
4276 :80A6842723108E1B= 685      4500 :002EFB1019BC1014= 562
4284 :58313F26FCBD1DA9= 877      4508 :2E26C14E25E0A682= 912
4292 :BD18A3BD8006815F= 923      4516 :8120271C81212716= 451
4300 :1027FF7C815B1027= 709      4524 :812C2712812D270E= 457
4308 :02C3810D27EA20D7= 859      4532 :812E270A813B2706= 457
4316 :1609F28680BD1041= 805      4540 :813A270220E03001= 533
4324 :8E0400BF0088BE10= 679      4548 :BF101CBE101A860F= 616
4332 :143089FE0C8C2454= 731      4556 :BD800F8620F61017= 783
```

the start of either the next or the last paragraph (CHR$(13) — linefeed).

Pressing <1> calls the 'Delete' text routine. Move the text under the cursor until it is over the first of the letters which are to be deleted. Press the <ENTER> key to mark the spot; this will be acknowledged by a 'BEEP'. Move the text again, until the cursor is one character past the last letter to be deleted, and press <Enter> again. Once the text has been deleted the program will return to the EDITOR screen. (If you imagine the program to be cutting real text out of a sheet of real paper, then the scissors would cut along the lefthand edge of the cursor each time the <Enter> is pressed.) Once text has been deleted, it cannot be retrieved.

Pressing <2> enters the Insert Text mode. Once again the cursor must be positioned over the text by pressing the arrow keys, and then pressing <Enter> to mark the spot. Inserted text will begin from where the cursor is in the text, and the character under the cursor will come after the inserted text. When the <Enter> is pressed, the screen will clear to black, and text can then be typed in. When the <Break> key is pressed, the text will be inserted into the main body of print, and the program will return to the EDITOR screen.

Pressing <3> calls the Move Text routine. This is a combination of the two previous routines. First the cursor is positioned to delete a block of text, and once this has been removed the cursor is repositioned to reinsert the block in its new position. Blocks of up to a thousand characters can be moved around using this routine. Pressing <4> calls the Text Copy routine which performs a similar function, but does not delete the text before copying it to some other part of the essay.

```
10 'HEX LOADER FOR 'WORDPROC' MEMOR
   Y DUMP. BY PETER WHITTAKER
20 INPUT"START ADDRESS";START
30 INPUT"FINISH ADDRESS";FINISH
40 FOR N=START TO FINISH STEP 8
50 PRINT N;": ";
60 TT=0:INPUT A$:Z=0
70 FOR M=1 TO LEN(A$) STEP2
80 L=VAL("&H"+MID$(A$,M,2))
90 TT=TT+L:POKEN+Z,L
100 Z=Z+1:NEXT M
110 PRINT" = ";
120 INPUT T
130 IF T<>TT THEN PRINT"error - ENT
    ER LINE AGAIN":GOTO50
140 NEXT N
```

Pressing <6> calls the Type Over routine, which enables the correction of simple spelling mistakes. The program will as usual display a screen full of text, with the cursor at its centre and as before the text can be moved by pressing the arrow keys. Pressing any other key will change the character under the cursor for that of the key pressed. Pressing <Break> will exit the routine, and return to the EDITOR screen.

The Search and Swap routine is called by pressing the <7>. This will then prompt you for a word to be searched for. Answer this by entering the incorrectly spelt word, and finish with the <Break>. Then enter the correct spelling of the word, and finish this also with the <Break>. The program will then swap all occurences of the first word for the second. Be carefull, however, for the program is quite happy to make some terrible blunders. For example, if you search for 'author' and swap for 'writer' the program will also change 'authority' to 'writerity'. The only limitation with this function is that it will not swap words of

```
4564 :BD800F5A26FAB610= 908
4572 :1881022707860FBD= 539
4580 :800F2005860EBD80= 645
4588 :0FA680810D271CBD= 707
4596 :800F810E2759810F= 558
4604 :275CBC101C25EA81= 763
4612 :202708A684812026= 576
4620 :023001BF101A860D= 431
4628 :BD800FB6102DBB01= 763
4636 :4AB7102D81382515= 561
4644 :860DBD800FB6102D= 722
4652 :BB014AB7102D8142= 701
4660 :25EE7F102DBC1014= 687
4668 :1025FF3916FE0986= 784
4676 :02B7101916FF3786= 692
4684 :01B7101916FF2FC6= 747
4692 :02F7101820A4C601= 684
4700 :F71018209D20494E= 659
4708 :5345525420444953= 574
4716 :4320262045 4E5445= 469
4724 :522046494C45204E= 512
4732 :414D45008E204144= 518
4740 :CBFF8C2834313136= 842
4748 :29C5323536C3FF8C= 985
4756 :2834313137290000= 286
4764 :E12246494C454E41= 690
4772 :4D45222C39333030= 428
4780 :2C41442C30003410= 337
4788 :86D7BD10418E04E2= 991
4796 :BF00888E1261BD90= 917
4804 :E5108E129EBD133C= 831
```

```
4812 :9EA63410308CAE9F= 913
4820 :A6A6841CFEBD86BC= 1257
4828 :308CBE9FA6A6841C= 1029
4836 :FEBDD53F35109FA6= 1113
4844 :351016FD5B00DC22= 689
4852 :46494C454E414D45= 577
4860 :2E42494E220086D4= 643
4868 :BD10418E04E2BF00= 833
4876 :888E1261BD90E510= 971
4884 :8E12F4BD133C9EA6= 996
4892 :3410308CD29FA6A6= 957
4900 :841CFEBDD4A73510= 1051
4908 :9FA6BE0652FC0654= 945
4916 :308BBF101416FD61= 786
4924 :8E0505BF00888E0C= 633
4932 :20C6088620BD800C= 733
4940 :A7805A26F88E0505= 823
4948 :BF00885F8E0C20BD= 797
4956 :800627FB81082610= 615
4964 :C10027F3BD800C86= 938
4972 :20A784301F5A20E7= 763
4980 :810D2714C10827DF= 664
4988 :810327DB810C27D7= 785
4996 :BD800CA7805C20CF= 955
5004 :8E0C20C608A680A7= 853
5012 :A05A26F93986D3BD= 1128
5020 :10418E0447BF0088= 625
5028 :8E1EF2BD90E58E04= 1122
5036 :80BF00888E1F05BD= 822
5044 :90E5BD8006810027= 864
5052 :F981312747813227= 755
```

…ly one letter in length. However, the good point is that the search and swap words need not be the same length. It is possible to search for 'Peter' and swap for Foolish Fat Fred'.

Pressing the <5> will display an EXIT screen, and you will have to press the <5> again to leave the program. Pressing any other key will return you to the EDITOR screen. This is to prevent accidental exiting from the program. However, if you do exit the program accidentally, and wish to restart it without losing all your text, then EXEC4151 instead of the usual EXEC4142.

Text Input Mode

Because the print routine takes care of wordsplit and page spacing, there is no need to worry about the end of lines when typing in text. The current type position is marked by a rapidly flashing question mark (?). To delete text, just hold down the <Left Arrow> key, and the cursor will work its way backwards. However, the cursor does not take account of 'Linefeeds' (CHR$(13)) as it moves backwards, so if deleting back over a new paragraph, it is wise to check how far back the cursor has really gone, by pressing <Shift & Up Arrow> to call the MENU screen, and then <2> to display the end of text.

There are several keys with special functions which can be called from the text input mode. The <Shift @> produces a CHR$(185) which is the Seikosha printer code for the £ sign. This is so that you do not have to reset the printer to use '#' for '£'. The next key of consequence is the <Shift Right Arrow> which prints CHR$(14), the code for double width print. <Shift Left Arrow> prints CHR$(15) for normal width print. The CHR$(14) is printed to screen as a RED block, and the CHR$(15) as a BLUE.

Pressing the <Clear> key, calls the special character routine. The bottom of the screen will display the code to be inserted at the next print location. This can be changed by pressing the up or down arrow keys. Pressing these with the shift key, will change the code in jumps of 10. Press the <Enter> to select the code displayed. These special keys can be used with the Editor functions, to insert text as well.

The final special key to remember is the <Right Arrow>. This calls the 'glossary routine'. A prompt is printed along the bottom of the screen, and the program waits for an input. Pressing the <*> clears the glossary of all its contents. Pressing the <?> puts you into glossary input mode. The screen will clear to white and wait for you to input the key letter (eg 'E'). Then type in the phrase to be called by this letter (eg 'Eschatological expectations'). Press <Break> to enter the phrase, and the computer will return to the text input mode. The next time you press the <Right Arrow> follow it with <E>, and the computer will add 'Eschatological expectations' to the end of the text. There is space for a glossary of about a thousand characters before it will start to overwrite the text memory. Once you have built up a useful glossary, you can resave the program by (C)SAVE(M)"WORDPROC", 3072,9216,4142. Now when the program loads, it will also load in the glossary with it.

One last point, if the Program I/D ERRORS or crashes because you pressed the RESET button, then it can be restarted without losing the current text by EXEC4151. Happy typing.

Program Alteration

The margin width is stored at &H1017, and the printer width-2 is stored at &H119F. The number of lines of text to a sheet is stored at &H1221, and &H1233 contains the number of lines including blanks, on a sheet. Location &H1B30 contains the code stored when the <Shift £> is pressed. It is currently set up to print a '£' on a Seikosha printer. Lastly, if the program keeps returning to the MENU screen, and will not let you enter any more text, this is not a bug! It is because the text memory is full (4000-4500 words), and the text will have to be saved and the memory cleared before typing can continue.

Too much of a Challenge?

IF YOU do not relish the task of typing in all this data, then I will be happy to supply a copy on tape (both disk and tape versions), for £3.00 including p&p. (96 Upper Holly Walk, Leamington Spa, Warwickshire CV32 4JP.)

```
5060 :7681331027015381= 566
5068 :34102701A1813510= 467
5076 :2706B881301027FC= 713
5084 :6F8136102701D781= 694
5092 :3710270290200CB20= 523
5100 :454449544F522031= 536
5108 :202044454C455445= 499
5116 :205445585420424C= 531
5124 :4F434B008E13EB10= 633
5132 :8E0403BD185CBD18= 667
5140 :B6BD18EDBD1A7216= 983
5148 :FF7B204544449544F= 783
5156 :5220322020494E53= 462
5164 :4552542054455854= 592
5172 :20424C4F434B008E= 537
5180 :141E108E0403BD18= 428
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5196 :0D26F9BF1024BD1A= 758
5204 :728680BD10418E04= 792
5212 :00BF00888E0C20BD= 702
5220 :80068100274C108E= 536
5228 :03E810BF10228103= 624
5236 :2731815F27E9815B= 804
5244 :27E5810A27E18109= 809
5252 :27DD81082753810C= 660
5260 :272D8115273F815D= 558
5268 :273F8113273FA780= 647
5276 :BD1707BD1DE38C10= 820
5284 :1025BCBF1028BD1A= 703
5292 :72BD1902BD19BB16= 753
5300 :FEE3BD188F20A8BD= 1226
5308 :19CCC680108E05E1= 943
5316 :E7A0108C060025F8= 838
5324 :B6101620C9860F20= 634
5332 :C5860E20C186B920= 921
5340 :BD868010BE008831= 842
5348 :3F108C04002506A7= 433
5356 :A410BF0088301F8C= 726
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5372 :7216FF6320454449= 732
5380 :544F52203320204D= 469
5388 :4F564520424C4F43= 554
5396 :4B204F4620544558= 529
5404 :54007F102A8E1500= 432
5412 :108E0402BD185CBD= 658
5420 :18B6BD1936B6102A= 714
5428 :1026FE61BD18EDBD= 1044
5436 :17ADBD1731810D26= 637
5444 :F9BF1024BD1902BD= 897
5452 :19BBBD1A7216FE45= 886
5460 :204544449544F5220= 519
5468 :342020434F505920= 463
5476 :424C4F434B204F46= 544
5484 :2054455854007F10= 500
5492 :2A8E1554108E0402= 453
5500 :BD185CBD18B6BD19= 914
5508 :36B6102A1026FE0D= 615
5516 :BD17ADBD1731810D= 788
5524 :26F9BF1024BD1902= 746
5532 :BD19BBBD1A7216FD= 1005
5540 :F420454449544F52= 731
5548 :203720204F564552= 467
```

```
5556 :2D54595045008E15= 530
5564 :A5108E0408BD185C= 640
5572 :BD17ADBD17318103= 778
5580 :270A810C2709A79F= 564
5588 :102020EC16FDBEBD= 970
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5620 :5741500020454E54= 495
5628 :4552205345415243= 549
5636 :4820574F5244203F= 515
5644 :0020454E54455220= 446
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5660 :454E5420574F5244= 579
5668 :203F00BD80068100= 547
5676 :27F981032746815F= 753
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5692 :FD5B811527138150= 774
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5708 :27D9A780BD800C20= 912
5716 :D2860FA78020CC86= 1024
5724 :0EA78020C6301F10= 634
5732 :BE008886AF313F10= 763
5740 :BF0088BD800C10BF= 863
5748 :008820AF3986AFBD= 898
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5764 :8E15E7BD90E58E04= 1102
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5780 :90E58E0D00BD1627= 778
5788 :301FBF102B8E0500= 476
5796 :BF00888E160DBD90= 837
5804 :E58E0C20BD162730= 713
5812 :1FBF10288E245410= 556
5820 :8E0D00A680A1A427= 813
5828 :08BC101425F516FC= 788
5836 :CCBF10243410A1A0= 836
5844 :262DA68010BC102B= 640
5852 :2FF4301FBF1026BD= 804
5860 :18ED35103410BF10= 605
5868 :24BD1902BE102410= 510
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5884 :8010BC10282FF635= 734
5892 :1020B4810D271281= 556
5900 :0E2712810F271281= 401
5908 :202712251 4BD800C= 475
5916 :3986A920F886BF20= 997
5924 :F486AF20F0868020= 1119
5932 :EC869F20E8BD8006= 1116
5940 :81002738108E03E8= 617
5948 :10BF1022BE102081= 624
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5972 :0D2755815F102700= 416
5980 :CD815B102700CD81= 814
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5996 :2700DB39BD188F20= 703
6004 :BC301F8C24542C03= 574
6012 :8E2454BF10208D29= 683
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6036 :E08C24542CE58E24= 935
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6060 :398E0420BF0088BE= 752
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6092 :BE0088108C05E027= 750
6100 :153001BC101425DE= 553
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6172 :FF8C283431313829= 682
6180 :3B2220223B008E24= 396
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6308 :0286FF108E0150A7= 797
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6324 :0239BD17ADBD1731= 705
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6340 :1A72BD1731810D26= 581
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6364 :BE102610BF1024BF= 694
6372 :1026BE1024BF1020= 535
6380 :39BE102410BE1026= 559
6388 :A6A0A78010BC1014= 861
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6492 :BD10418E04E0BF00= 831
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6748 :434F4445203D223B= 469
6756 :FF8C283431313829= 682
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7156 :8E1FEA301FA68027= 819
7164 :27810D2753812025= 501
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7180 :1FE72C71FC0088C4= 1003
7188 :1FC10026E0FC0088= 874
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7396 :8600A780BF1FE716= 904
7404 :F3F1A78086A920EB= 1349
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7468 :10418E04C8BF0088= 754
7476 :8E1D44BD90E5301F= 880
7484 :8C000026F916F39B= 847
7492 :20474C4F53534152= 571
7500 :592046554C4C0086= 562
```

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7588  :101416FD28810D27= 532
7596  :258120270E810F27= 434
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7660  :03BD1DF139108E04= 681
7668  :00A6A820A7A0108C= 849
7676  :05E025F510BE0088= 853
7684  :31A8E010BF008839= 841
7692  :206D656E75808066= 827
7700  :756E6374696F6E73= 883
7708  :0020302020454449= 354
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7740  :540D312020524541= 426
7748  :442054455854204F= 536
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7788  :205343524545454E0D= 493
7796  :332020505052494E54= 512
7804  :205445585420544F= 552
7812  :205052494E544552= 580
7820  :0D34202053415645= 432
7828  :205445585420544F= 552
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7836  :20444953430D3520= 421
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7868  :4849465420555020= 528
7876  :4152524F5720464F= 576
7884  :52204D454E552E0D= 482
7892  :534849465420444F= 561
7900  :574E204152524F57= 592
7908  :20464F5220454449= 505
7916  :544F522E0D002065= 437
7924  :6469746F72808066= 904
7932  :756E6374696F6E73= 883
7940  :002030202020204D45= 322
7948  :4E552046554E4354= 579
7956  :494F4E5320544142= 560
7964  :4C450D3120202044= 371
7972  :454C455445205445= 552
7980  :58540D3220202049= 404
7988  :4E53455254205445= 581
7996  :58540D332020204D= 409
8004  :4F56452054455854= 591
8012  :20424C4F434B0D34= 460
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8028  :54455854204 24C4F= 578
8036  :434B0D3520202045= 373
8044  :5849542050524F47= 589
8052  :52414D0D36202020= 387
8060  :545950452D4F5645= 601
8068  :5220544449544F52= 569
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8084  :52434820414E4420= 496
8092  :535741500D002044= 428
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8116  :53534F5200205052= 521
8124  :4F4752414D204558= 563
8132  :49540020434F5059= 504
8140  :5249474854205045= 563
8148  :5445522057484954= 583
8156  :54414B4552203139= 513
8164  :3835000000000000= 109
```

PATCH FOR TAPE.

BY PETER WHITTAKER

```
 7837  :544150450D352020= 428
*****************
 7860  :544150450D002053= 426
*****************
 4700  :F71018209D205245= 659
 4708  :4144592054415045= 552
 4716  :202620454E544552= 484
 4724  :2046494C45204E41= 495
 4732  :4D4500008E204144= 453
*****************
 4756  :283431313729009A= 440
```

```
 4764  :4D2246494C454E41= 542
*****************
 4828  :308CBD9FA6A6841C= 1028
 4836  :FEBDB68235109FA6= 1149
 4844  :351016FD5B994D22= 699
*****************
 4860  :22000000000086D4= 380
*****************
 4892  :3410308CD19FA6A6= 956
 4900  :841CFEBDB6D43510= 1066
 4908  :9FA6BE007E301F12= 738
 4916  :1212BF101416FD61= 635
*****************
```

FLEX revisited

***Roy Coates** takes another look at the new official Dragon operating system, FLEX*

NOW THAT Eurohard has decided to drop OS9 in favour of FLEX as the official Dragon operating system, it is worth taking a look at just what FLEX is.

FLEX first appeared in 1977 and was written by an American company called Technical Systems Consultants Incorporated.

It has been run on a variety of 6800 and 6809 based machines in all sorts of environments and for all sorts of different purposes. The FLEX used for this review is a custom version written for the Dragon by the London based firm Compusense and they have added a few features to make life a little more comfortable. These include a modified 51 by 24 screen display using PMODE 4 graphics which is a marvellous improvement over the standard 32 by 16 Dragon display.

Machine code chunk

FLEX is an 8K chunk of machine code residing in RAM which handles all the disk and terminal I/O. All the usual DOS commands such as CAT, LIST, SAVE and so on are stored on disk and are only loaded into RAM when they are required. This is the way in which most of the expensive 'real' computers work and is obviously very efficient when it comes to saving valuable memory. One of the big attractions of FLEX for me is that FLEX is a very 'open' system. By that I mean that the documentation giving the entry points to all the routines contained within FLEX and all of the useful locations used by FLEX is readily available in the FLEX Advanced Programmers Guide. I don't think that you need to be an advanced programmer to deal with FLEX, as most of the things you would want to do have already been done for you. The routines available within FLEX include all possible disk operations, text operations such as input a character or number, output a character or number, print a string and many more. Even the error handling is extremely simple and all these functions are very well documented.

Getting FLEX started is simplicity itself. Simply type BOOT for the Dragondos version, or RUNM"FLEX" for the Delta DOS version, and within a few seconds the Hi-Res 51 column screen will appear with the FLEX copyright line at the top. You will be prompted for the current date. When entered, the FLEX prompt '+++' will now appear and the system is ready for use. FLEX is very user friendly — it is difficult to make mistakes as any command which may delete a file or disk asks you twice if you are certain that you wish the operation to continue. An example of this is the DELETE a file command.

```
delete jetset.bin
DELETE JETSET.BIN ?? y
ARE YOU SURE (Y or N) ?? n
AH! I THOUGHT SO.
```

A FLEX file specification consists of the filename which may be up to eight characters in length, followed by a three character 'filetype'. For example:

DATABASE.BIN	Is a machine code file.
MYPROG .TXT	Is a standard FLEX text file.
MYPROG .BAK	Is a backup file created by the editor.

As well as the file name and type, other information pertainting to the file is stored, such as the date of creation and the file protection allocated to it. The files may be Delete protected, Write protected or catalogue protected so that they do not appear to exist on the disk at all. This last option may seem a little strange but I for one have found a use for it when running FLEX on a single drive system. If all of the system utilities are catalogue protected, then the system becomes 'transparent' and the disk appears to contain only your own files which is obviously neater and far easier to work with. The minimum hardware required to run FLEX using either a Delta or Dragondos cartridge is a Dragon 64 and at least one disk drive. Alternatively a Dragon 32 may be used in conjunction with the excellent and much un-publicised PLUS cartridge available from Andteck Data Design.

Contents of the FLEX system disk

APPEND	**Concatenates two or more files.**
ASMB	**TSC 6809 Assembler.**
ASN	**Defines which disk drives are system and which are work drives.**
BACKUP	**Creates a security copy of a disk.**
BAUD	**Sets the BAUD rate at which the Dragon's serial port may be used.**
BUILD	**Is used to create text files.**
CAT	**Catalogues the contents of a disk.**
COPY	**Copies files from disk to disk.**
CS	**This file holds the data used for the character set used in the Hi-Res display. Eight different styles of character set are supplied.**
DATE	**Is used to set or display the current date.**
DELETE	**Deletes the specified files from a disk.**
DRIVES	**Is used to tell FLEX how many disk drives are connected to the system.**
EDIT	**'TSC' Standard Text Editor.**
EXEC	**A list of FLEX commands may be stored in a normal text file and the list executed using the EXEC command.**
FLEX.SYS	**This is the 'core' of the FLEX system and is copied into RAM when the system is booted.**
H	**This prevents execution of the specified command until a key is pressed so that, for example, disks may be changed.**
I	**All input for a specified command is taken from a specified input file.**
JUMP	**Passes control to a machine code program at a specified address.**
LINK	**Is used when creating a FLEX system disk.**
LIST	**Lists a specified text file.**
NEWDISK	**This utility formats a blank disk for use with FLEX.**
D	**Re-directs all output from a specified task to a specified file.**
P	**Re-directs the output from the specified task to the printer.**
PROT	**Changes the protection of a specified file.**
RENAME	**Is used to change the filename of a file.**
S	**Re-directs all output from a specified jot to the Dragons serial port.**
SAVE	**Saves a specified section of the Dragons memory to disk.**
SDC	**Is 'single disk copy' and allows files to be copied from one disk to another on a system with only one disk drive.**
STEP	**Allows the user to define the step rate for their disk drives.**
TTYSET	**This utility is used to set terminal attributes if using something other than the Dragon as a terminal.**
VERIFY	**Switches the verify option on or off when saving or loading a disk file.**
VERSION	**Informs the user of the version of a specified utility.**
XOUT	**Deletes all files having the extension OUT.**

The FLEX system disk supplied by Compusense contains all sorts of useful goodies. Everything you would need to use the system is contained on the disk. There are also two special utilities provided — the text editor and the assembler. The text editor is line orientated and is a very powerful one. The assembler must be the most powerful that I ever seen. Just about every feature you could want from an assembler is included.

One really useful facility is Library which gives you the ability to call other source files from within your main source file and have them included in the assembly. For example, I have a file called FLEXLINK.TXT on my system disk which contains a list of all the FLEX routines and their addresses so that whenever I am writing a program which is to be linked to FLEX I simply add the line

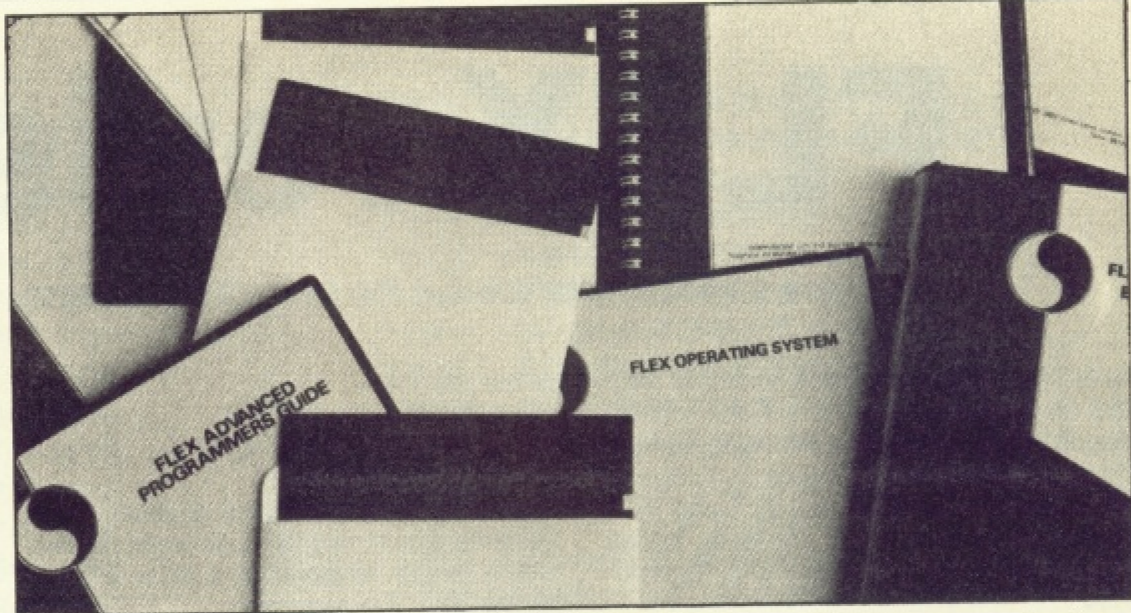
```
LIB FLEXLINK.TXT
```

to my source file and the equates stored in that file are automatically included in my assembly. This means that my program can use FLEX calls such as

```
JSR     PSTRNG
```

which prints a string of text to the terminal, with no need to define the entry point of the routine 'PSTRNG'.

Once FLEX has been booted on a standard Dragon 64, the user is left with RAM from 0 to $BFFF completely free for their own programs. Although the Dragons BASIC is not immediately available when FLEX is installed, a modified version called DBASIC is available on disk which has links through to the FLEX system to give access to disk files as well as the ability to pass commands to FLEX itself. The DBASIC package also allows use of the 51 column display which is a great improvement over the standard Dragon display. Other versions of BASIC are also available for FLEX. So are 'C', Crunch Cobol and many other languages. There are also many utilties available including Word processors, Text processors, Spreadsheets, Data-base systems, Assemblers and cross-assemblers, De-bugging programs, and the list is growing all the time.



In conclusion, after many months of using FLEX I don't know how I ever managed without it. FLEX expands the capabilities of the Dragon by an incredible amount, something that cannot be done with most of the other home micros. Eurohard has settled on FLEX as their standard operating system and Compusense, the official Dragon importers, has been heavily involved with FLEX for many years and is continually updating the range of software for it. For anyone put off by the price, you are getting an awful lot of software for your money and I think you have more chance of being run over by Concorde than of regretting the purchase of FLEX. If I had my way, FLEX would be compulsory for every Dragon owner. Compulsory FLEX operating system, editor and assembler with DBASIC package . . . £99.99. FLEX Advanced programmers guide . . . £11.50.

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Firmware

Brian Cadge explores the Dragon's ROM in a special series which builds up month by month into a firmware manual.

THE DRAGON's ROM contains 16K of machine code routines for handling the screen, keyboard, graphics, and sound necessary for Microsoft Basic. Many of these routines are extremely useful for the machine code programmer, and some can even be used directly from Basic.

To use a "firmware" (ROM) routine in your own programs, it it necessary to know several pieces of information. Obviously, the entry address is required, but also any special entry requirements, such as registers and memory locations which must be set up, and the exit conditions of the routines.

This new series of articles will tell you all you ever wanted to know about the inner workings of the Dragon. Every useful ROM routine is given as well as a complete memory map of locations used. Each aspect of the firmware will be considered individually, starting this month with the cassette handling firmware. Anyone writing assembly programs with any save/load options (such as adventure games, word processors, databases and the like) will find all the relevant information here. Many of the locations given can also be PEEKed (and POKEd) by the Basic programmer to enhance a Basic program.

Each section will take the form of a memory map showing all the useful locations which are used by the routines documented, followed by the firmware routine entry points and notes. Wherever possible, the Tandy CoCo (extended Basic 1.1) routine address will also be given in brackets. Generally the routines are identical on the two machines, differing only by the position in the ROM.

By the end of the series you will have a complete "firmware manual" for your Dragon computer.

The Cassette Operating System

The Cassette Operating System (COS) routines deal with reading and writing files to tape. The various levels of the system allow reading and writing on the character by character, block by block, or whole file basis. Output is via the 6 bit D/A converter and input via an input zero crossing detector. The cassette interface operates at approximately 1500 baud (about 190 characters per second).

A standard Dragon file is made up of the following sections on tape:

1 A leader of bytes of value $55 (normally 128)
2 A filename block
3 A 0.5 second gap of tape
4 Another leader of value $55
5 One or more blocks of data
6 An End of file block

Each block consists of the following:

1 A leader byte of $55
2 A Sync byte of $3C
3 Block type byte
4 Block length byte (0-255)
5 Data bytes (up to 255)
6 Checksum byte
7 A trailer byte of $55

The block type byte signals the type of information in the block. 0 = Filename block, 1 = Data block, 255 = End of File marker block. The checksum byte is calculated by summing items 3, 4 and 5 together. This is used to detect CRC errors.

The Filename block is a special type of data block found at the start of all files. It is 15 bytes long and contains the following information:

1 Eight characters for the filename
2 A file type byte
3 An ASCII flag byte
4 A gap flag byte
5 Two bytes for the start address of machine code
6 Two bytes for the entry address of machine code

The file type byte signals the type of file which follows: 0 = tokenised basic, 1 = ASCII data, 2 = Binary. The ASCII flag byte is zero for binary files, non-zero for ASCII files. Finally, the Gap flag byte takes the value 1 for a continuous file, and 255 for a file with start/stop gaps.

COS Memory Map

The following locations are those used by the cassette operating system. Most are set up before calling one of the COS routines. Some, such as the status byte, start address and error code, can be usefully PEEKed from basic. All addresses are given in decimal. Where two consecutive locations are given, the value is 16 bit with MSB first.

110 Cassette I/O flag. This has the value 255 when cassette input or output is taking place.

112 End of file flag. After a block is read, this location signals the end of file has been reached if it is set to non-zero. (This is the location used by the EOF (−1) command in Basic.)

120 Cassette Status Byte. This can take three values. 0 means the cassette stream is closed, 1 means the stream is open for input, and 2 means it is open for output. This location can be peeked from basic to avoid both 'NO' and 'AO' errors from occuring

121 I/O buffer size.

122-123 Header buffer address, the address of the filename block in memory. Set up internally.

124 Cassette Block Type. This is taken from the start of the block just read and is as detailed above.

125 Cassette Block Length. This is the number of bytes which have been read, or are to be written.

126-127 Cassette I/O buffer address. This contains the address of where to put a block of data read, or from where a block of data is to be written.

128 Used internally for calculating the checksum.

129 I/O error code. This contains a code relating to the cause of the error. 0 = No error, 1 = CRC (checksum) error, 2 = attempted to load into an area where there was not RAM.

130-132 Temporary locations used by the COS internally.

144-145 Cassette Leader byte count. This is the number of bytes of $55 output as the leader. This is normally set to 128, but can be POKEd to a larger value if you suffer from repeated I/O errors caused by over-sensitive ALC cassette recorders.

149-150 Motor On delay. When the cassette motor on routine is called it performs a delay loop before returning; this is effectively the length of the interblock gap on data files. The 16 bit value in these locations are used for the size of the delay loop. Initially, this is set to be about 0.5 seconds; again, this can be changed to a larger value for cassette recorders which take a while to reach full speed.

465 Length of the Filename. This is the number of significant characters in the filename, and can range from zero to eight.

466-473 Cassette filename to search for, or to write out.

474-728 COS default I/O buffer. This is an area of memory used to load the filename block and ASCII data blocks into. If this contains a filename block, then the following locations can be peeked:

474-481 Filename of file found

482 File Type Byte (see tape format information)

483 ASCII flag byte (see tape format information)

484 Gap flag byte (see tape format information)

485-486 16 bit entry address for m/c code programs

487-488 16 bit load address for m/c code programs

The following locations are different for the Tandy COCO machine:

138-139 Motor On delay. The details are as for locations 149-150 above.

146-147 Cassette Leader byte count. Details as for locations 144-145 above.

Next month, we conclude our look at the cassette operating system with a list of all the relevant firmware routines and their entry and exit conditions.



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Rule Britannia

Program: *Britannia*, Keydata, PO Box 5, Lytham St Annes, Lancs FY8 4SH
Price: £5.99

IT'S refreshing to see that small software houses can still produce good material for the Dragon, and Keydata has put a lot of effort into this strategy game which asks you not to rule the world, but merely try to run Britain between the years 410 and 590 AD.

It's a familiar theme, and one that's easy to do badly, but here you sit up from the start when a suitably grand piece of music is played from the cassette through the TV speaker to get you into the mood for the game. It's a nice touch, but would have been nicer if we didn't then have to sit through the screeching data loading.

Never mind, once loaded you're given the option of resuming a saved game, and asked if you wish to make use of the high-speed poke. My machine won't cope with this, but even without it the responses were fast enough. The story is that the Roman legions have had to withdraw from the country, leaving 24 regions in England and Wales to fend for themselves against the marauding hordes of Saxons, Picts, Gauls and Scots. A numbered map is given for reference on the cassette insert, with a high-res display available to show you how you're faring against the enemy.

Each province is capable of carrying various numbers of infantry, cavalry, mercenaries and so on, and the strategy problems aren't of feeding the population or growing produce, but mainly mobilising troops to defend different areas under attack. You have to act quickly and hire troops in the various coastal provinces, as the Gauls in the south and the Scots in the north will start trying to make inroads at once, and if they seize a province you'll have to move troops from elsewhere to try to retake it.

The single-letter commands (also listed on the insert) allow you to send out scouts, attack and counter-attack, plead with Rome for help and so on: 13 possible commands altogether. Apart from using troops, you can strengthen your provinces by putting up buildings, though naturally this eats into the old kitty.

There are one or two minor irritations, such as the amount of information you have to sit through and try to take in at the end of each year when the reckoning's done, but that's no great drawback and if, for instance, you enjoyed Dragon Data's *Viking* then you should give *Britannia* a try too.

Mike Gerrard



Reeling About

Program: *Bandito,* Pocket Money Software, 41 Truro Road, St Austell, Cornwall.
Price: £1.99.

LET ME declare my prejudice right from the start and say that I've always thought one-arm bandit simulations to be just about the most useless use for a home computer, only marginally more interesting than using one as a doorstop.

That said, *Bandito* is reasonably well done, starting with optional instructions (well, you've got to know how to rotate the reels, haven't you?) and giving you a stake of £1, with each turn costing you 10p. The highest prize you can win is £2, though I was hard pressed just to stay in credit.



The program includes a HOLD feature, and also a GAMBLE or COLLECT option if you manage a winning line.

GAMBLE means you can multiply your winnings if you can stop an arrow at a particular point on a scale.

You may also NUDGE from time to time, though both nudges and holds came up rather too infrequently for my liking. Pressing the space bar 10 times in a row with no wins, no holds and no nudges is hardly a thrilling experience.

Bandito's best feature is the graphics, which scroll round very smoothly indeed, but even at £1.99 I wouldn't be gambling my pocket money on this one.

Mike Gerrard



Screaming Abdabs

Program: *Screaming Abdabs*, A & F Software, Canal Side Estate, Woodbine Street East, Rochdale OL16 5LB
Price £6.90

IF A & F Software continue at this rate they could very easily become a top Dragon software house. First, the excellent *Chuckie Egg,* and now this superb *Manic Miner* clone.

The *Manic Miner* type of game is one of my favourites thus giving this game a distinct advantage. However, even those who mock this software breed will not be able to deny that this is an excellently designed and executed game.

As has been said, it's a *Miner* clone, consisting of 35 very complex screens, each more challenging than you are at first led to expect, and to negotiate these screens you get five lives plus a bonus life at 5,000 points.

There is an option for keyboard or joystick, one to four players, and, although undocumented, pressing 'c' changes the colour set.

There is a pause facility but for some inexplicable reason it seems not to work when playing the game in keyboard mode.

The most interesting feature built into the game is the "Randomize" mode which, when selected, will pick any of the 35 screens, at random, for the player's enjoyment (!)

The graphics are superb; if the screen looks cluttered at times it is due to the complexity of the game.

This game not only features moving and collapsing platforms, it also has electric walls, transporters, moving beams (a la *Donkey Kong Jnr*), switches, and the usual run of everyday objects turned mutant (we have screws, televisions, no toilets -- sadly — and scissors to name but a few) but they move in *two dimensions* — they move up and down as well as left and right.

The unclear instructions do not tell you that you have to collect all the food on a given screen before you can collect the key and finish the screen; rather they imply that you can collect the key at any time.

This game, apart from the very small niggles above, is faultless. It looks good (even the loading is great once you realise that the computer is not actually crashing — it's meant to load that way!). And what's more it plays fairly which means no collisions are registered unless they actually take place on screen (regular players of *Jet-Set Willy* will know what I mean) and plays very well.

This is yet another one for the collection — unless, of course, you hate *Manic Miner*. I wholeheartedly recommend it.

Jason Orbaum



Assembly points

Program: *Alldream*, Grosvenor Software, 22 Grosvenor Road, Seaford, East Sussex BN25 2BS.
Price: £12.95.

A FREQUENTLY asked question is 'Which assembler package should I buy?'. One of the best and most popular to date for the Dragon has been the *Dream* range. This was originally marketed by Dragon Data as *Alldream* on cartridge and in two parts, *Dream* and *Dreambug* on cassette. Since the demise of Dragon Data the authors, Grosvenor Software, have taken over the marketing and are now offering *Alldream* on a single cassette, cartridge or Dragondos disk.

The cassette version of *Alldream* is reviewed here. The manual supplied is extremely well written and produced. it seems to be word-for-word identical to that produced by Dragon Data, but at least Grosvenor have made it a decent size (Dragon Data's manual was only four inches by three inches). There are plenty of examples sprinkled throughout the text with the mandatory program to fill the screen with a particular character — why do all assembler manuals have to include this program?!

Alldream is designed to the co-resident with Basic programs and is loaded into reserved RAM after issuing a CLEAR statement. The lower HIMEM is set, the more space you will get for the assembly language text. The first section of *Alldream* that faces you is the screen editor. *Dream* does not use line numbers at all, and the editing commands are quite different from the Basic line editor. All the keyboard characters now have autorepeat and the capslock works backwards, which means that shift+A gives lowercase "a".

The cursor can be moved to any part of the text file using the arrowed keys. Moving off the top or bottom of the screen causes it to scroll up or down, and using shift and an arrowed key gives a much faster scroll for quickly locating text.

Assembly language commands are typed one per line and can be entered, if desired, with each 'field' tabbed to the correct column to make the program easier to read, or just typed normally to save space. Inserting characters is very easily done; shift+right arrow shuffles the characters to the right of the cursor along to make space. There is, however, no automatic wrapround of text to the next line, so characters shifted off the end of the line are lost.

The *Dream* editor also has a number of commands which are all preceded by the Break key. For example, Break-I will inserts a blank line ready for more text, and Break-F/string/ will find the first occurrence of 'string' after the cursor. Whole blocks of text can also be marked and copied, moved or deleted. Once the text is completed it can be saved to cassette using the Break-S command. Cassette files can also be merged and printed.

The program is assembled using the Break-A command. *Dream* allows labels of up to six significant characters. During the second pass, a listing of the assembled program is output, showing the address, op-codes and mnemonic. Errors are given as one letter codes and the listing stops at an error until a key is pressed. The listing can also be paused by pressing Break, and slowed down by pressing 'B'.

A new set of commands is now available, preceded once again by the Break key. Break-P prints out an assembly listing of the program, and Break-X will run the program just assembled from the beginning, or from the address of a special label starting with an '@' character. A nice feature of the assembler is the PUT directive, which allows programs to be assembled to run at one address, but to be stored at another. Useful if you want programs which will run where *Dream* is located.

The Break-G command takes you into the third section of the *Alldream* package, the *Dreambug* monitor program. Again, all commands are one letter long and are followed by one or more parameters. Numbers may be entered as either decimal or hex.

Dreambug allows a number of Breakpoints to be added into your program. These allow the program to run normally until the Breakpoint address is reached. Control is then passed to *Dreambug* which will display a list of the CPU register contents and the next command to be executed. Up to 10 breakpoints are allowed and these are automatically reset when the program ends.

Another method of testing programs is using the tracing facilities of *Dreambug*. The 6809 cpu operation is mimicked by the tracer which can execute single instructions and display the cpu register contents between each. Alternatively, instructions can be executed a set number of times, or until the contents of a memory address change. Single stepping is a very powerful tool for debugging programs and is particularly well implemented in *Dreambug*.

As an overall package *Alldream* is hard to fault. The editor is a joy to use and makes Basic's line editor look feeble. The assembler supports *all* the instructions and addressing modes of the 6809 (certain other popular assemblers do not!). The disk version of *Alldream* (called *Dskdream*) looks even better, allowing assembly to and from disk, giving the potential for huge programs to be assembled. If I had to find fault with *Alldream* it would be that it only allows lines to be 32 characters wide, which leaves only a few characters for comments, and the fact that there are no built in commands for saving binary code (assembled programs) to tape, although this is quite possible using CSAVEM from basic.

For the *Alldream*, *Dskdream,* or Dragon Data *Dream* owner, Grosvenor Software have now released a program called *Dreamprt*. This is a program written in Basic which allows *Dream* text files to be printed out as 64 character wide lines.

The idea behind *Dreamprt* is that the *Dream* editor is so good it could be called a simple word processor, so text is prepared using this and then printed out by loading in *Dreamprt*. The program takes every two lines of text and printed them as one, there is no formatting or right justification available, although this could have easily been implemented within the Basic program.

The program allows a number of characters to be sent to the printer before printing and at the start of each line, for example, the 'tab' character would be useful on 80 column printers.

Dreamprt does not make *Dream* a real 'wordprocessor', but it is ideal for anyone who already owns a package including *Dream* and who wants to use it to prepare simple documents, such as letters or memos. Even at £4.50 *Dreamprt* seems a little expensive for a program written entirely in Basic, but it is a useful addition to the *Dream* range.

Brian Cadge

Slide

Program: *Slide*, Pocket Money Software, 41 Truro Road, St Austell, Cornwall.
Price: £1.99

SLIDE turns your TV screen into one of those pocket puzzles where you have to push pieces around in order to reform a picture or sequence of letters or numbers. In each of the three puzzles there is naturally one blank space to help you in this, otherwise the game would be a complete non-starter. Mind you, it's not much of a starter as it is. You use the arrow keys to move the blank piece round the board — a quite logical arrangement whereby the down arrow moves it up and the left arrow moves it right, and so on.

Each puzzle is a six by seven grid, graded for difficulty, the easiest being a straightforward sequence of numbers, next easiest hexadecimal numbers from one to 29, and hardest is a map of the good old USA. Pressing 'H' at any time will show you the correct solution, and this stays on the screen for as long as you care to keep it there.

I find this type of puzzle exceedingly tedious, and because of this quickly noticed one glaring fault, which is that you can't quit a game to choose another option. You have to reload or risk your luck with the reset button. Even if you like this type of game, it would seem easier to me to try the real pocket variety: much neater than Dragon, tape deck and VDU, which I find tend to make my pockets bulge somewhat.

Mike Gerrard

Domino doctors disks

Program: *Disc Doctor,* 112 Priory Avenue, Taunton, Somerset TA1 1YB

Price: £19.45

DRAGONDOS is as reliable as any other 5" disk system, but disks do get corrupted, especially if you are prone to spilling coffee all over them! So you have your treasured program on a disk which has just fallen in the milk shake, and you've forgotton to make a back up of the disk. Trying to run the program just gets you an ?RF error — what do you do? Answer, get the Doctor — well the *Disk Doctor* anyway.

The first real *Disk Doctor* program I have seen for Dragondos is from Domino Computing. This is supplied on two double sided disks which can be inserted either way up, giving you a total of four copies of the program. The 'double' sided disks are really just single sided disks with the write protect notch and index hole punched out so that the unguaranteed side of the disk can be read.

The purpose of all this is because the *Disk Doctor* disk cannot be copied because some of the sectors have been formatted in a format unknown to Dragondos, so the Backup command fails. Unfortunately, there are so many sticky labels all over the disk that it frequently got stuck in my drive and had to be prised out!

The software is a mixture of protected Basic and machine code routines. As well as the *Disk Doctor* itself, there are a number of utilities offered. For example, all the 'killed files' can be restored providing no new informtion has been put on the disk since the files were erased. The files appear as NAME.101, NAME. 102 and so on in the directory.

Another option allows you to view the files which are flagged as being erased from the disk, but are still in the directory. Output can be sent to the screen or printer. All the files on a disk can have the protection bit set or cleared in one go using the Protection option.

One of the least useful utilities is to send a directory listing to the printer, that is a DIR to printer rather than screen. What's wrong with POKE 111,254:DIR I want to know? A much more useful utility gives full information on all entries on the directory track. The name, type, start end and execute addresses are displayed, together with the track and sector numbers used by the file.

Dragondos owners have probably found for themselves that you can save a program to disk with no name as in SAVE" ", but you cannot kill it off, or rename it. Another of the utilities on this disk will rename all null-named files to DOMINO1, DOMINO2 etc, so that you can rename them or kill them off.

The final utility will verify all tracks and sectors of a disk, reporting faulty ones. It does this simply by using the SREAD command and trapping disk errors.

Some of these utilities will probably be of use to most users from time to time, although most could easily be written yourself given the *Dragondos Programmer's Guidebook*. However, what makes this disk worthwhile is the *Disk Doctor* program.

This is fully automated, and works basically as follows. The program attempts to read through the corrupted disk, noting which sectors cannot be read. It then checks through the directory and finds which files use the corrupted sectors. These sectors are replaced with clean ones containing REM statements on the 'repaired' disk.

The program is not 100 per cent successful at restoring damaged disks, but performed very well on my few corrupted disks. *Disk Doctor* and its Utilities will work with either a single or double drive system. You are asked how many drives you have at the beginning of the program. Interestingly, the program will not perform operations on itself!

If not for a couple of minus points I would suggest that *Disk Doctor* is a valuable must for all Dragondos owners. However, the price is not realistic at £19.45. The 'double sided' method makes a mess of the disks the program is supplied on, and the manual is not up to much at all. However, the manual I saw was only a draft version, so perhaps it will be transformed into something decent for the production copy.

Disk Doctor is a very useful and well written program which will be genuinely useful to users. If you can justify the cost then I recommend it. A Delta Dos version of the program should be available shortly.

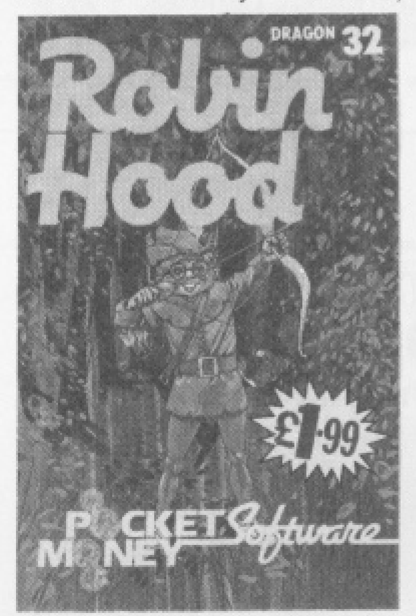
Brian Cadge



Robin's no robbery

Program: *Robin Hood*, Pocket Money Software, 41 Truro Road, St Austell, Cornwall.
Price: £1.99

OUT OF the recent batch of Pocket Money releases, Robin Hood was one of my favourites, one of the few I'd actually go out and buy. Okay, so it's an inferior version of *The King*, but it's still great fun to play and has many an amusing touch about it. Instead of rescuing the blonde starlet from the clutches of the killer gorilla, you're rescuing Maid Marion from the Sheriff of Nottingham's castle. Instead of barrels, you'll be bowled over by boulders,



which the evil Sheriff tries to drop on your head from the ramparts at the top of the screen. He does follow your movements left and right before dropping the rock, and while that's not too much of a problem when you're way down at the bottom, it creates a bit of bother as you climb up.

Rather than a continual pathway with ladders, this is a platform-type screen, with Robin having to leap from place to place, trying to avoid a fall through to the moat beneath, and trying also to pick up the bags of gold and crowns for bonus points, and the key that you'll need to release the maidenly Marion. The top level of platforms also has several arrows winging their way across, just to add to the problems, though if you do get to Marion (all right, so I didn't), there's then a bonus screen.

Beyond that, I don't know, but while I'm sure it won't have the complexity of *The King* or *Manic Miner*, at £1.99 Robin's robbing no one.

Mike Gerrard

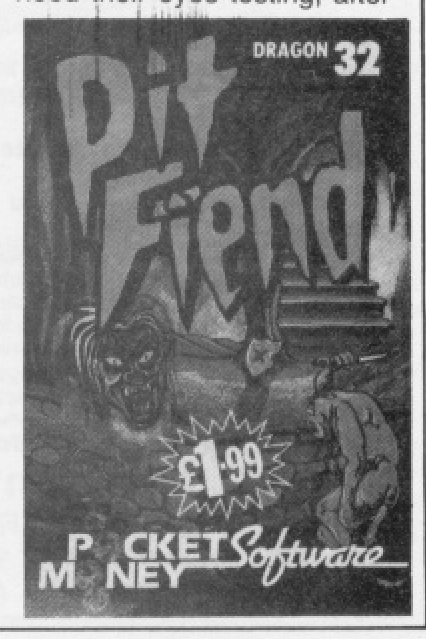


The pits?

Program: *Pit Fiend*, Pocket Money Software, 41 Truro Road, St Austell, Cornwall.
Price: £1.99

CAN YOU pit your wits down the pits and collect together the nine pieces of a broken shield that have been scattered around the five different levels of the dungeon depths? You use the arrow keys to move your man round the mazes (corridors through brick-like structures), with the 'U' and 'D' keys to move up or down a level provided you're standing on one of the appropriate staircases that link the different levels. Move over a bit of the shield and it's filled in on the mini-shield at the foot of the screen.

You start with three lives, and as in Microdeal games of yore you can choose from three different coloured screens, though anyone choosing the buff screen will need their eyes testing, after-

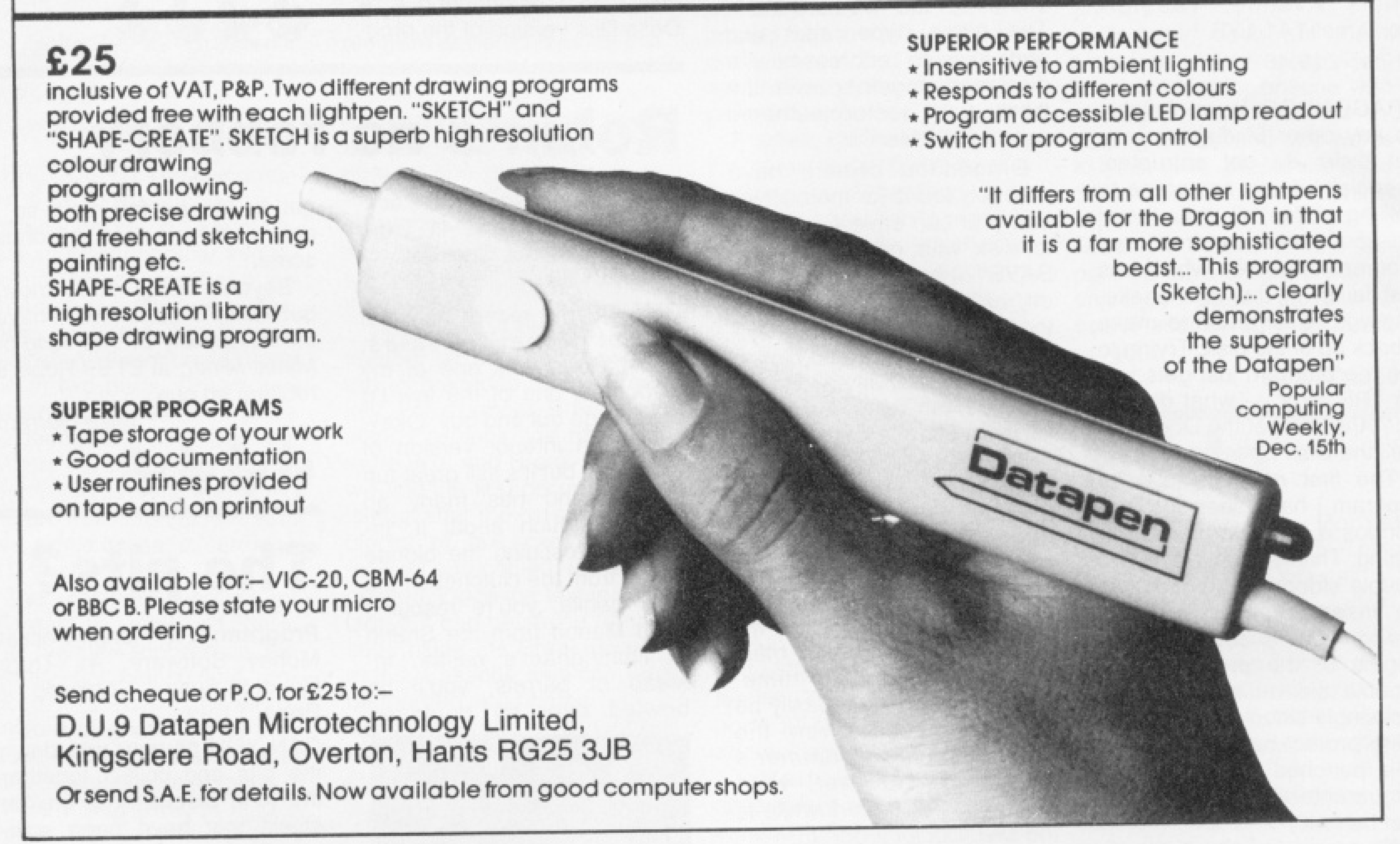


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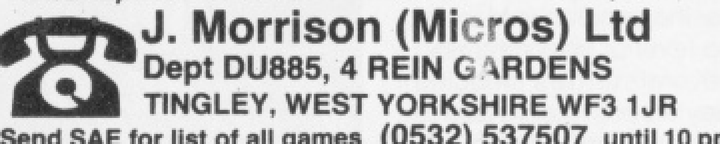


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wards if not before. A supply of oxygen is running out at the right of the screen, while you also have to contend with the pit fiends themselves, *Pacman*-like ghosts which roam the corridors. Your defence against these is to bash the space bar to send a spinning knife in the direction you're facing. Or it may be a boomerang, as it does come bouncing back to you.

The man plods round the corridors well enough, and the game is quite tricky without exactly having me coming back for more. *Pit Fiend* is about average among these recent Pocket Money releases, more or less what I expected the £1.99 range to provide. Okay, but not worth a full price release.

Mike Gerrard



Money, money

Program: *Daybook, Cashbook, Sales and Purchase Ledgers*, Software Design, 80 Woodroyd, Golcar, Huddersfield, West Yorkshire.
Price: £14.95

SOFTWARE Design has released a suite of accounts programs for the cassette based Dragon 32 and 64. The software consists of three cassettes, one for *Daybook*, one for *Cashbook*, and one for *Sales and Purchase Ledgers*. The author has provided separate versions for 32K and 64K machines on either side of the cassette, rather than testing how much memory is available from within the program, presumably to save memory. Indeed the whole philosophy behind this software seems to be memory conservation.

The general presentation is, to say the least, poor. The cassettes are supplied with brown paper inserts and the instructions(!) are computer printed on a sheet of this brown paper. The instruction sheet states that "Having purchased a computer accounts program it is assumed that the user has some knowledge of both", and you'll certainly need it!

Once the Basic program has loaded a very short piece of machine code is then also loaded and the main menu is displayed. There are 10 options available in all of the programs. The first programs which should be used are the cashbook, to enter credits and debits, and the daybook. Option 1 is used to enter new data, simple form fill techniques are used to enter the name, date, reference, discount, cash, bank and so on of each record. The error checking is very limited, and if the amounts entered do not balance the message 'Incorrect Entry' is displayed.

Having entered the data, option 2 allows you to search for a particular record by the name, date, or amount. In the Ledger program it simply displays an alphabetical list of all the account names. The search seems to work quite efficiently for a Basic program.

Option 3 allows you to 'browse' through the records, using the arrow keys to scroll entries up or down. This option uses the Dragon's display quite well with a simple windowing method. The record currently at the top of the screen can be viewed in full, or edited if required. The editing procedure is rather clumsy, each field is displayed and given a number, the user then enters the field number to be changed, and the whole field is retyped.

Selecting the sort option allows an alphabetical or date sort to be performed on the data. This can take quite a while with a lot of data in the machine. Records can also be printed out in form suitable for your accountant to comprehend.

One of the best features of the set of programs is that files are transportable across from the daybook and cashbook to the ledger program via the save and load options, which saves a lot of unnecessary typing. As with most of the options, pressing Enter to any prompt will return you to the main menu, useful if you select a particular option by mistake.

A lot of effort has obviously gone into this software, and indeed it seems to have all the facilities necessary to 'Computerise' the accounts of a very small business or individual. It seems a shame that the software is spoilt by being so un-user-friendly simply to save memory. It is not fair to assume that the user will be familiar with computers or even accounting to that extent. The instructions are wholly inadequate, even rambling on about how strings are stored within the Dragon's memory (very interesting to a business user!) when nowhere near enough has been said about the progams themselves.

All this is not to say that the software is not useful. If you are prepared to work out how to use the programs largely for yourself, and have a cassette based system, then this suite of software will serve as an introduction to computer accounting.

Brian Cadge



Fearless Freddie!

Program: *Fearless Freddie*, Microdeal, 41 Truro Road, St Austell, Cornwall, PL25 5JE
Price: £1.99

A CONTROVERSIAL game in my house this one. People either seem to love it or hate it — my advice is see it before you buy.

I think it's great, if untidy. The idea of the game is to collect all the objects on a screen avoiding the various monsters a la *Manic Miner*. Only this game is different from its revered predecessor.

Firstly it has no jump, only left and right. Upwards movement is obtained by getting onto lifts. Secondly, it has no limit on the distance you can fall so long as you don't end up in a cauldron or a fireball!

In many respects in fact it bears more of a similarity to A & F's *Chuckie Egg* (which I am unreliably informed, was also designed by Matthew Smith — but no doubt you will correct me if I'm wrong).

The graphics seem to range from the great to the intolerably bad. The screens are all well designed, the features introduced sequentially and neatly, and when you are used to the game there is skill level two to play which appears to go on for ever!

The character is an incoherent mess graphically as are some of the foods and I have already found one bug in the game as well as a couple of design flaws but despite this I still enjoy loading the game up for a quick touch of the daring doos!

Jason Orbaum



It's time for tea!

Program: *Tea-time*, Microdeal, 41 Truro Road, St Austell, Cornwall, PL25 5JE
Price: £1.99

THE STAR of my batch from Pocket Money, this is a good game, programmed better than a lot of those retailing for £8 in Microdeal's main range.

The game, however, does not have enough sophistication to be worth the higher price and so is justifiably placed in this range.

The aim of the game is to control a tea pot which must first catch falling tea drops and then avoid deadly sugar cubes. The game has several shades of *Bubble Buster/Datafall* within it but plays considerably better than them.

There are three screens which repeat in turn, each time being more difficult than the last. They are well designed, excellently laid out, and very challenging.

There is an option to start at any screen and a high score table that keeps the top five sets of three initials in order.

The thing that lifts this game out of the mediocre is its absolutely superb look. It is very neatly laid out, plays all its tunes without disastrously flat notes and has a very clever compartment layout using a sub-screen/border technique to great effect.

The game almost gets a five out of five rating but doesn't have that addictive quality to give the player the urge to load it up. When it's in, the "one more game" syndrome operates efficiently but it's a matter of the urge to load.

In short then, a good game that handles nicely and looks great.

Jason Orbaum



The numbers game—part two

Pam D'Arcy has had so much mail about her disassembler for beginners in the June issue that she has had to extend it — this month, how to dump to printers, and loading machine code programs with offsets

HAVING GIVEN you a 'disassembler for beginners', thinking that beginners cannot afford printers, the requests are coming in for a printer option — and lots and lots of queries regarding loading machine code programs with offsets.

Print-out option

The screen display is not compiled sequentially so I have taken the easiest option for all of us — appendage of a 50 byte TEXT SCREEN DUMP SUBROUTINE to the existing code invoked by the 'K' key press requiring just 3 bytes of existing code to be amended (by POKEs direct from the keyboard).

Saved as a separate entity, the text screen dump subroutine can be used, once loaded, from other programs and direct from the keyboard **(EXEC15211).** If used in the latter mode, should the screen be full, the top line will be lost because of automatic scrolling following typing in of the EXEC statement.

Amending the assembler using the hex loader program

Load the HEX LOADER program and, should you want to cross check the total checksum of the routine being appended, amend line 42 to read:
42 T=0: FOR N=15211 RO 15260
then type CLEAR 200, 12001

Load the existing DISASSEMBLER into memory (at address **12001)**

Enter the new code (Listing 2, DISASSEMBLER HEX DUMP) and **RUN42** should you want to cross-check the data entry.

From the keyboard, change 3 bytes of the original DISASSEMBLER thus:
POKE 12226,23
POKE 12227,11
POKE 12228,166
(tape) **CSAVEM"progname", 12001, 15260, 12001**
(disk) **SAVE "progname", 12001,15261,12001**
and away you go! A sample of the dump is given covering the changed bytes (Listing 3) — bytes $2FC2 (12226+) and $3B6B (15211+).

Amending the program using an assembler

An Assembler source listing is given (Listing 1). Using DSKDREAM, the sequence followed was:
CLEAR200,15210
RUN"DSKDREAM.BIN"
enter, save source, assemble & quit
CLEAR200,12001
LOAD existing disassembler
POKE 12226,23
POKE 12227,11
POKE 12228,166
SAVE "newname", 12001,15261,12001
(I know 15259 is actually sufficent for 'end address+1' — I am keeping it the same as the hex load amend which includes 2 null bytes for rounding reasons!)

Ameding the 'K' key

Should you wish to change the key to be pressed to give the printer dump, the new key value should be POKEd into 12220.

```
3B6B              *
3B6B              * SCREEN PRINTER DUMP
3B6B              *
3B6B
3B6B              * ASSEMBLED USING DSKDREAM
3B6B              * AFTER CLEAR 200,15210
3B6B
3B6B
3B6B              * commence with CR(automatic LF)
3B6B 860D         DUMP   LDA   #$0D
3B6D BD800F              JSR   $800F     ;Print ROM
3B70 8E0400              LDX   #$400     ;scr.start
3B73
3B73              * convert text screen ('POKE')
3B73              * chars to ASCII for print
3B73 A680         NEXTCH LDA   ,X+
3B75 817F                CMPA  #$7F
3B77 220E                BHI   PRINT     ;graph.chr
3B79 8120                CMPA  #$20
3B7B 2204                BHI   NOTLOW
3B7D 8A60                ORA   #$60      ;lowercase
3B7F 2006                BRA   PRINT
3B81
3B81 8160         NOTLOW CMPA  #$60
3B83 2502                BLO   PRINT     ;caps OK
3B85 84BF                ANDA  #$BF      ;non-alpha
3B87
3B87 BD800F       PRINT  JSR   $800F
3B8A
3B8A              * CR(LF) if end of screen line
3B8A 1F10                TFR   X,D       ;next addr
3B8C C41F                ANDB  #$1F      ;rem./32
3B8E 2605                BNE   CHKEND    ;not integ
3B90
3B90 860D                LDA   #$0D
3B92 BD800F              JSR   $800F
3B95
3B95              *check for end of screen reached
3B95 8C0600       CHKEND CMPX  #$600
3B98 26D9                BNE   NEXTCH
3B9A 39                  RTS
3B9B
```

```
DISASSEMBLER HEX DUMP

15211 86 0D BD 80 0F 8E 04 00 A6 80   919
15221 81 7F 22 0E 81 20 22 04 8A 60   737
15231 20 06 81 60 25 02 84 BF BD 80   942
15241 0F 1F 10 C4 1F 26 05 86 0D BD   668
15251 80 0F 8C 06 00 26 D9 39 00 00   601

   OVERALL CHECKSUM TOTAL 3867
```

The values are listed in the Dragon manual (pp. 136-137). 'With shift key' are the normal values. Byte 12220 currently contains 75 (K). To change it to, say 'P' **POKE 12220,80**

Loading maching code programs with offset

This facility enables relocatable machine code to be positioned elsewhere in memory. Loading from cassette with offset (=value to be added to the LOAD and EXEC address) is described on p. 135 of the manual. Note that DISK loading with the optional parameter is DIFFERENT (and easier!) from tape loading.

To take Belgian reader Maarten Van Warnelen's enquiry: "Do you know a way to put a machine code program higher in memory, say the disassembler at address 29000?"

1) Calculate the offset=required load address − current load address =29000 − 12001 = 16999
2) **CLEAR 200,29000**
3) **CLOADM "progname", 16999**
4) The address that a program is saved from becomes its 'normal' load address. Should it be preferable to normally load the disassembler at this address, save it anew:
CSAVEM"newname",29000,32259,29000

Subsequent CLOADM's without offset will load this version in at 29000. (As mentioned in the article, some identification of load address as part of the program name is a great aide memoire — eg. DIS29000).

Should you have completely forgotten a tape program's load address and do not possess a decent tape catalogue program, **CLOADM** it then from the keyboard enter:
PRINT PEEK (157)*256+PEEK (158)
PRINT PEEK (126)*256+PEEK (127)

The former gives you the EXEC address of the newly loaded machine code program which — unless you are unlucky! — will also be the LOAD address. The latter gives you the END ADDRESS+1 occupied by the program just loaded.

Loading machine code programs at a lower address in memory

BASIC will not allow you to include a minus sign with the offset (FC error results), so we are forced to 'cheat' the system using the 'magic' number 65536. Example: load the disassembler at 10000 instead of at 12001:

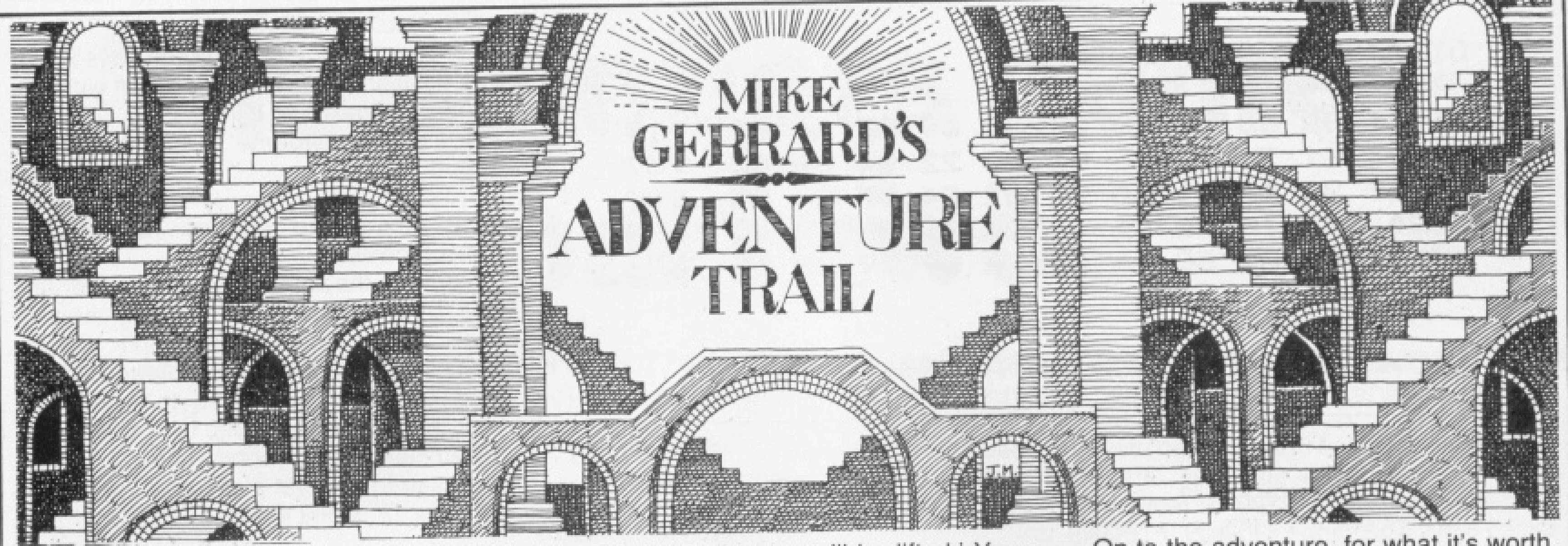
1) Take 65536, subject from it the 'normal' load address, add to the result the required load address = required offset = 65536 − 12001 = 53535 + 10000 = 63535
2) **CLEAR 200,10000**
3) **CLOADM"progname", 63535**
4) Again, the program may be saved from this position to become a version with this as the 'normal' load address:
CSAVEM "newname", 10000, 13259, 10000

Why hex dump listings rather than source code?

Perhaps the Editor ought to answer this one, but Maarten also asks why there is such a proliferation of number dumps when readers are keen to practise with their Assemblers? Suffice to say that it took me three attempts to get the disassembler article short enough to be accepted in the first place and the source listing is 12 pages long . . .?!!!

Sample dump taken using amended program

```
$2FC2 170BA6    LBSR  LABEL      ——> Amended
                      $3B6B          instruction
$2FC5 200A      BRA   LABEL
                      $2FD1
$2FC7 8108      CMPA  #$08
$2FC9 2606      BNE   LABEL
                      $2FD1
$2FCB EC8CAF    LDD   LABEL,PCR
                      $2F7D
$2FCE ED8CB4    STD   LABEL,PCR
                      $2F85
$2FD1 17FF34    LBSR  LABEL
                      $2F08
$2FD4 EC8CAE    LDD   LABEL,PCR
                      $2F85
$3B6B 860D      LDA   #$0D
$3B6D BD800F    JSR   $800F ea
$3B70 8E0400    LDX   #$0400
$3B73 A680      LDA   ,X+
$3B75 817F      CMPA  #$7F
$3B77 220E      BHI   LABEL
                      $3B87
$3B79 8120      CMPA  #$20
$3B7B 2204      BHI   LABEL
                      $3B81
$3B7D 8A60      ORA   #$60
$3B7F 2006      BRA   LABEL
                      $3B87
$3B81 8160      CMPA  #$60
$3B83 2502      BCS   LABEL
                      $3B87
$3B85 84BF      ANDA  #$BF
$3B87 BD800F    JSR   $800F ea
$3B8A 1F10      TFR   X,D
$3B8C C41F      ANDB  #$1F
$3B8E 2605      BNE   LABEL
                      $3B95
$3B90 860D      LDA   #$0D
$3B92 BD800F    JSR   $800F ea
$3B95 8C0600    CMPX  #$0600
$3B98 26D9      BNE   LABEL
                      $3B73
$3B9A 39        RTS
```



IF YOU'RE bemoaning the lack of new Dragon adventures over the usually quiet summer months, then Don't Panic! The Scott Adams conversions from Adventure International are said to be almost ready, though it's getting to the stage where I'll believe them when I see them. Meanwhile, I've been looking at an old title from Peaksoft called . . . *Don't Panic.* I picked this up from Peaksoft proprietor Harry Whitehouse at the second 6809 show, where the two-adventure tape was on sale for a very reasonable £2.50. Harry was very modest about the contents, describing them as old-fashioned text adventures, but as they were unfamiliar to me I thought I'd give them the once-over and I'm glad I did.

Both adventures load together and you're asked at the start if you'd like to tackle *Towers of Death* or *The Ice Kingdom.* While it might appear from that that each of these is only half-an-adventure in size, they do take up about 24K of memory altogether, and of course much of the actual core program is the same for both, avoiding duplication.

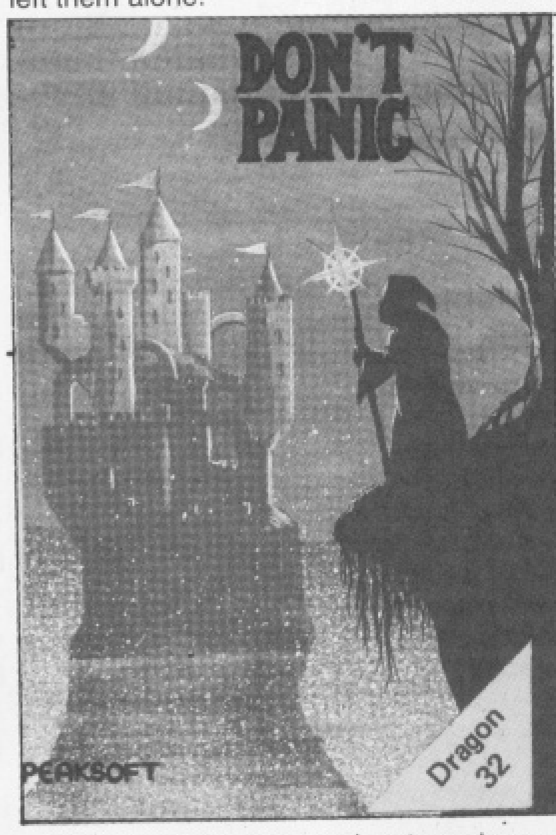
The Ice Kingdom sends you in search of the Tome of Understanding, which lies somewhere to the east of the Black Mountains, and that's all you're told about the Tome. You start in your own village, with nothing at all to aid you. The location description, visible objects and obvious exits are all stated at the top of the screen, with your "What Now?" prompt beneath.

I wandered through some leafy paths and dark woods (more smart economy, as some of these appear in both adventures!) till I found a poacher's hut and our old friend the axe. Also some bees and flowers. Then I went up into the mountains to met an even older friend, the bear in the cave, and no prizes for guessing what he wanted. Unfortunately as I was just about to go past him, the program crashed with a syntax error. I must stress that this was due to some garbled data on my copy of the tape, and not to a fault in the program itself, so I'm sure Peaksoft will quickly replace it.

Towers of Death worked perfectly, and allowed me to see that there are quite a lot of locations and interesting problems tucked away in these two titles.

This second one begins: "There is an old legend which states: 'When the Eagle-Man of Alabaster enters the Obsidian Towers, the evil curse will be lifted.' Your mentor has sent you to find the old sage of the woods and to test the legend!"

It didn't take me long to find the old sage, though he didn't have any old onions with him, and he gives you some helpful advice which it's best not to follow straight away. Make sure you've explored every nook and cranny first, in the 11 glades, desert, mountains and crags of the initial batch of locations. I quickly found also the large gates marking the Obsidian Towers, but as there was rather a nasty sound coming from behind them and I didn't think I was quite equipped to deal with it yet, I left them alone.



The text in these two adventures is very brief, and the word recognition and other features are fairly primitive, as Peaksoft admits, but nevertheless for £2.50 the pair they're worth having if you haven't seen them and are desperate for adventure.

Even if you are desperate I wouldn't recommend this month's only new title, *Escape from Hell House* from Libra Software. This comes with a version of *Invaders* on the other side, and to get that out of the way it is very crude and slow, with poor collision detection, poor response from the laser base to movement keys/joystick, and finally you can't actually fire when your base is moving.

On to the adventure, for what it's worth. The scenario is summed up very easily: "You are trapped in Hell House. The house has three floors with four rooms on each floor. You must solve the problems of escape." On each of the three levels, then, there are rooms to north, south, east and west of you, with each move you make using up 10 of your 200 energy units. There is some food in one of the rooms, and this adds to your energy level when eaten. There are 14 commands available to you through single letter inputs, plus movement commands, so 'P' for instance means 'Pick it up,' while 'M' means 'Use the magnet,' which does tend to give part of the game away.

There's an instant death routine on each floor, curiously enough each being accompanied by a spelling mistake: *to slow he got you, he ask's for the pass word* and *sorry that did no good your dead.* This gives you some indication of the level of the game, which is pretty low, and pretty limited.

But on to brighter things, and readers' letters. It's obvious that many of you are stuck in *Madness and the Minotaur,* judging by the requests I've had for hint sheets, and those should all have reached you by now. One went to Tim Lees of The Cottage, Tabora, London Road, Brighton BN1 8QA, who in addition is having trouble with a game called *Quest,* from Dragon Data (RIP). This is a new one to me, but Tim's problem is not of trolls and treasure but of "RG Error in 5130" just as he's getting towards the end of the game. If anyone else has come across that and found the correction needed then can you let Tim know?

Tony Barker of 71 Crows Road, Epping, Essex CH16 5DH asks for text adventures with lots of orcs and goblins to fight, as he prefers the Fighting Fantasy style to straightforward adventuring. I've recommended *Monsters and Magic* from Touchmaster at £3.95, *Sword and the Sorceror* (£3.95, Blaby Computer Games) and to a lesser extent *Keys of the Wizard* (£8.00, Microdeal). This isn't really my type of game, though, so if anyone's any better suggestions why not write to Tony direct.

Someone offering and asking for help is Tim Urwin, 11 Mercia Avenue, Kenilworth, Warwickshire CV8 1EU. Tim can give help with *Ring of Darkness, Towers of Death* and *Timeport 1,* and in return needs help

on *Timeport 2, Syzygy, Madness and the Minotaur* and *Return of the Ring.* Tim's also trying to get hold of copies of *Treasure Tombe* and *Crystal Chalice* from Dungeon Software, if anyone can help him there.

The dreaded *El Diablero* turns up yet again, with Howard Billington asking for help in five different places:

1) How to get past the man with the machete after gazing at the yellow pool.
2) Where to dip the stick.
3) Where to find the desert beetles.
4) What's the significance of the lizard, snake and crow.
5) How to turn into an aminal.

Howard's address for help on those is Homeways, 14 Rafborn Avenue, Salendine Nook, Huddersfield HD3 3UJ. Also in need of diabolic help is Stephen Cogan of 674 King Lane, Leeds LS17 7AR, who's looking for an eagle and some magic beads.

Andrew Bett of Mill Cottage, Little Carlton, Louth, Lincolnshire LN11 8HP, is an example of how not to write a letter! Andrew is stuck in *Black Sanctum,* and asks me how he can beat it. I've written back to Andrew trying to help him, but it's very difficult to answer a general question like that, when you don't know if the player's stuck at the first problem, the last problem, or anywhere in between. Please ask specific questions where you can, and I'll do my best to answer them or put you in touch with another reader who can . . .

Someone kindly offering help on the first two parts of *The Ket Trilogy* is Mathew Lodge, "Maen Melin", Holmes Chapel Road, Lach Dennis, Northwich, Cheshire CW9 7SZ. Mathew managed to find a bug in *The Mountains of Ket* which allowed him to score 101 per cent in solving this part. Unfortunately you only get the code word if you score exactly 100 per cent, so Mathew had to go back and do it properly. What Mathew discovered is that when you've traded the *Goblin Gazette* for gold from the goblin who is bored, you can change the gold for 50 coins, then go back to re-buy the *Gazette* for two coins, give it straight back for more gold, and then go on doing this until, as he says, you get fed up of it.

Malcolm Shazell, 294 Saltash Road, Keyham, Plymouth PL2 2DG, needs help on *Castle Blackstar,* another title I'm not familiar with, so if anyone out there is playing or has played it, perhaps you'd get in touch with Malcolm. Richard Comoch of New House Farm, Tytherington, Wotton-under-Edge, Glos GL12 2QB, has lost his original instruction book for *Madness and the Minotaur,* and wonders if anyone can spare him one?

Finally those clues promised last month on *The Cricklewood Incident,* courtesy of Paul Watson, so if you don't want to know about them then stop reading here.

Still with us? Right, then to begin with you must catch the bus to the DHSS and sign on, go east to the Garden Centre to buy some shrubs, then to the Sauna to get an iron bar. This you use in the Cheese Shop to hit the Greek in order to get a map, and then you buy a truss and some travel sickness pills in the chemist.

That's as far as I'll take it this month, so with my travel sickness pills and my trusty truss in my hand, I'll leave you and march off towards next month's column.

Adventure Helpline

To help puzzled adventurers further, we are instituting an Adventure Helpline — simply fill in the coupon below, stating the name of the adventure, your problem and your name and address, and send it to Dragon User Adventure Helpline, 12/13 Little Newport Stret, London WC2H 7PP. As soon as enough entries have arrived, we will start printing them in the magazine.

Don't worry — you'll still have Adventure Trail to write to as well!

Adventure ....
Problem..
....
Name ....
Address..
.... **Sept 85**

Stylograph

I USE a Dragon 64 OS9 system with double disk drive and a Tandy Daisy Wheel IIB printer with external Discom 16K printer buffer.

Everything works together very efficiently except that I'm unable to access the pound sign on the Tandy printwheel when using the Stylograph word-processing program. The printwheel is a Ricoh compatible 124 character affair with a hash accessed by Hex 3 and the pound sign accessed by Hex A3.

I can send Hex A3 to the printer, making it print a pound sign, via the OS9 operating system using the "display" command. But Stylograph seems to suppress code A3 when I try to send it using a printer control character defined by the ".pc" command. I get a hash instead of a pound sign! I've also tried to persuade Stylograph to recognise Hex A3 by using Styfix, but again to no avail.

David Taylor
67 Addison Road
Wanstead
London E11 2RG

THE PROBLEM with Stylograph seems to be that it will only allow 7 bits for characters, the eighth bit being used to signal stylo control codes perhaps. The published method of redefining the printer character codes, by editing the STYPS file, will not work for codes over 127 decimal.

Unfortunately, I have not been able to find a way of overcoming this problem from within Stylograph. Perhaps one of our readers knows of a solution?

OS Error

I AM using my Dragon 32 to produce story outlines, mini comprehensions and the like for my remedial pupils. I cannot get more than 255 characters in to the machine before I get an "OS ERROR" message, even though I am using different strings. (I know I can only get 255 in one string; but why only 255 altogether?) The handbook is no help. It says use "CLEAR" but I lose all, of course.

Brian Jefferson
Branksome School
Eggleston View
Darlington DL3 9SH



YOU ARE correct in thinking that any one string can only store up to 255 characters. However, the overall number of characters allowed for all strings has to be set by the user — this is known as "String Space".

On power up the Dragon gives you 200 bytes or characters of string space, so even if you use different strings, the total number of characters that can be stored before an OS ERROR occurs is only 200.

The CLEAR command is used to change this. For example, to give you 5000 characters of string space you need to add line 5 CLEAR 5000.

Sound signals

I'VE HAD lots of problems with the sound in my Dragon 32. In fact I know that the computer works perfectly, so it seems that the fault is on the TV, which is a Hitachi make and produced in Greece. But I've also tried the Dragon on a German TV, SABA make but I've had the same problems. I wonder if you could advise me on that, because I do get a perfect display.

Sotos Mandalos
13 Argolidos Street
Ampelokipi
GR-115 23 Athens
Greece

THE FIRST thing to check is whether you have a sound signal at pin 1 of the monitor socket. If not, then the problem lies somewhere in the sound generation circuit, which could be any one of a number of components. If you get sound at the monitor socket, but not through the TV, then it is probably the Modulator which needs replacing.

Audio On

I HAVE come across two problems while doing machine code.

How is it possible to access Audio On and Audio Off from machine code?

Is there a machine code routine somewhere to access a headerless program? If so where and how could it be used from assembly code?

Paul Burgin
18 Moorcroft Road
Fulwood
Sheffield S10 4GS

THE AUDIO ON and OFF commands can be accessed by the following routines in machine code;

AUDIO ON 47852 (Dragon) & 43421 (Tandy) {'B'=0}

AUDIO OFF 47811 (Dragon) & 43380 (Tandy)

To load a Basic program whose header has been corrupted, position the tape immediately after the header, and type;

MOTOR ON: EXEC &HB714

The program will then load, and can be re-saved correctly.

Division?

I HAVE been trying to learn machine code but despite reading three books on the subject, I have been unable to find out how to perform division (except by two) or how to handle fractions (such as might occur during division).

Can you explain how to do this or point me in the direction of some more information literature.

D Bateman
14 Hawthorn Way
Royston

I SUGGEST you get a copy of *6809 Machine Code Programming* by David Barrow, published by Granada. This book refers to the Dragon, and has a section on multiplication and division, explaining clearly the principles involved. Two programs are listed, one for 8 bit and one for 16 bit division.

Circles

AT THE moment I am trying to write a program to draw a pie chart. However, I am having difficulty in drawing the lines from the centre to the appropriate position on the circle. Please could you explain how to do this.

Tony Chapman
Grantham
Lincs

THE FOLLOWING Basic program can be used to produce pie charts. It can be expanded to produce different colours and such. The value of ST and EN should be the Start and End positions of the segment to be drawn, as used by the Basic CIRCLE command.

```
50 DEF FNX(X)=128+50 *SIN((X+0.25)*6.24)
60 DEF FNY(X)=96-50*COS((X+0.25)*6.24)
200 ST=0:EN=0.3
210 CIRCLE(128,96),50,,1,ST,EN
220 LINE (128,96)-(FNX(ST),FNY(ST)),PSET
230 LINE (128,96)-(FNX(EN),FNY(EN)),PSET
1000 GOTO 1000
```

Fast mode

COULD YOU tell me how to load a program from cassette which was saved accidentally in a faster speed (actually Poke 65495,0). The program was extremely long and took many hours to type in.

Neil Woodhead
Todmorden

PROGRAMS which have been saved whilst in the fast mode cannot be loaded back whilst in this mode. The Dragon must be put in to the highest speed mode available, which also has the effect of losing the screen display.

Use the following commands to load your program back in;

AUDIO ON:POKE 65497,0:CLOAD

The Audio On is so that you can hear the program loading, as you will not be able to see anything on the screen. Once loaded press the RESET button and try listing the program. If it has loaded correctly then save it at the normal speed.

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The only figures that count

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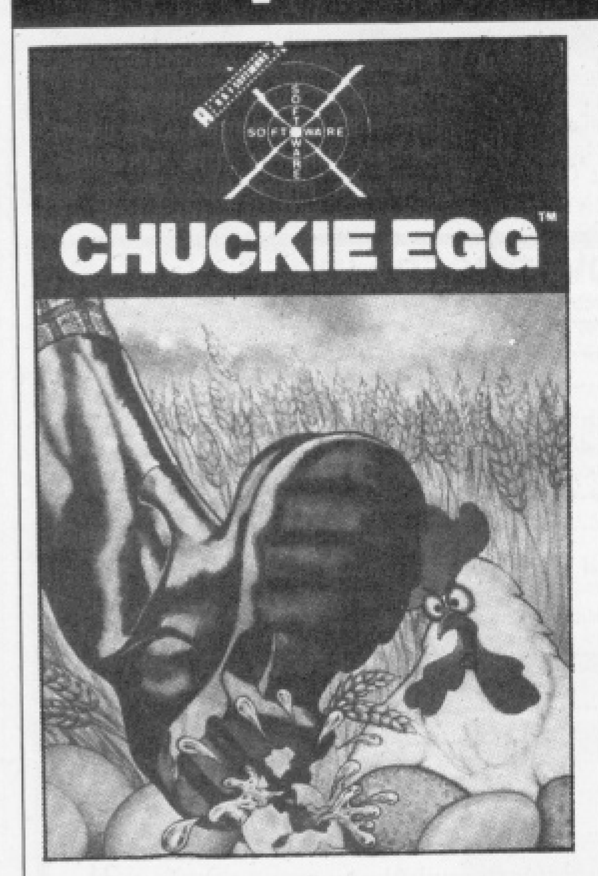
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Competition Corner

Answers to Competition Corner, *Dragon User*, 12-13 Little Newport Street, London WC2H 7PP.



***Gordon Lee** with another mathematical conundrum — 15, copies of Chuckie Egg and Screaming Abdabs from A'n'F software to be won.*

LAST MONTH on this page we looked at a problem in computing which, at present, remains unanswered — at least it is one for which no satisfactory mathematical proof has so far been found. Take any number; if it is even divide by two; if it is odd then multiply by three and add one. This simple exercise is repeated until the number finally decreases to one. As was mentioned, all numbers so far tested have eventually decreased to this number, although no rigid mathematical proof has, as yet, been found to support this.

Indeed, a quite simple logical 'proof' seems to suggest that the reverse will occur and the number will tend to increase without limit. The proof is simply that at any stage in the process a number has an equal chance of being even or odd. If it is even it is halved, but if it is odd it is increased by a factor of slightly more than three. Thus the average result over a number of steps will be in the order of 3N/2 — in other words, the number will gradually increase without limit — a fact which we know by experiment to be wrong!

The fallacy in the argument is fairly easy to spot. When an odd number increases by a factor of 3N+1, it must become an even number, and so will immediately be halved at the next step. So an odd number has a net gain of only 1.5N (plus a tiny bit more), and if this is now averaged with the factor of 0.5 in the case of even numbers, the overall result will be a *decrease* of about 0.75 per step — a figure which approximates roughly to that obtained by actual experiment.

The third possibility that was mentioned last month concerned the endless loop that would occur if a number was reached that had already occured during the calculation. This is a distinct possibility, and again, there is no definite proof either one way or the other. As has been stated, actual experiment argues against such a set of numbers, but, who knows? Somewhere in the vast infinite expanse of integers there may be such a set of numbers that will form an endless loop. So far, though, they have eluded detection. Maybe some keen 'Dragon User' will find one!

It may be thought that one way to understand the problem is to study it in reverse. That is, begin with 1 and trace each subsequent number backwards. Unfortunately, this brings with it certain problems. Every so often the track divides into two branches. For example, 11 can only lead on to 22, but 22 can branch to either 44 *or* to 7. Algebraically, any number of the form 6Z+4, where Z is any positive whole number, will divide in this way. It is not difficult to realise that these ramifications will soon become very diverse. The accompanying diagram shows the start of such a tree, containing just a few selected values. If the theory that all integers finally reduce to 1 is true, then this diagram will have to extend outward to infinity. Also, every conceivable positive integer that exists will be found once, and once only, in its own unique position on such a tree.

For the competition this month, consider the 251 digit number $10^{250}+1$. That is, 1 followed by 249 zeros, followed by 1. If you were to start with this number, can you determine how many steps would be needed in order to reduce it down to 1?

Prize

FIFTEEN entrants can win copies of both *Chuckie Egg* and *Screaming Abdabs* from A'nF — two excellent arcade games for your Dragon!

Rules

TO WIN copies of *Chuckie Egg* and *Screaming Abdabs* you must first show the answer to the competition, and secondly show how to solve it with the use of a Basic program written on your Dragon.

Please do not send in a cassette containing your answer.

Make sure your name and address are clearly printed on your entry and mark the envelope September competition.

As a tiebreaker, complete the following sentence in 10 words or less: "I want to go to work on a Chuckie Egg because . . ."

Entries must reach *Dragon User* by the last working day in September. The winners will be announced in the December issue. The editor's decision is final, and no correspondence will be entered into.

June Winners

GRAHAM BEEN of Bedford has won himself copies of all the Scott Adams' Classic Adventures on the Dragon, plus *The Hulk* and *Spiderman.*

Fifteen other *Dragon User* readers have won themselves copies of Scott's *The Sorcerer of Claymorgue Castle.*

They are A A S Randall of Lowestoft, R J Telkman of Sale, Chen Zhiwei of the Beijing Institute of Aeronautics and Astronautics, China, John O'Leary of Macroom, Eire, Simon Cayuela of Blois, France, Mrs D Thompson of Elswick, M Armistead of Basingstoke, Boris Leblanc of Devil la Barre, France, Gary Codding of Chelmsford, Gregory Gallagher of Sholing, Phillip Murphy of Leadgate, Graham Rae of Falkirk, Ross Hamilton of Chandlers Ford, John Rust of Mold, and Henry Gibbons of Barking.

They will be receiving their prizes in due course (although it may take a bit longer to get to China!)

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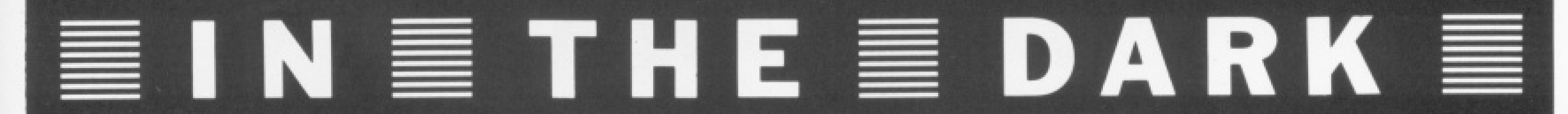
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